VOL. XIII AUGUST, 1929 No. 4

The Journal of APPLIED PSYCHOLOGY

JAMES P. PORTER, EDITOR
Ohio University, Athens, Ohio
WITH A BOARD OF CO-OPERATING EDITORS

TABLE OF CONTENTS

F. RODNEY GILLESPIE AND R. A. BROTEMARKLE. Interpolated Revision of College Adult-Level Norms for Personnel Procedure 325
C. E. BENSON AND D. B. LUCAS. The Historical Trend of Negative Appeals in Advertising 346
FRIEDA A. KIEFER. Manual Motor Correlation in Superior Children 357
T. A. JACKSON. Errors in Self Judgment 372
WILLIAM F. BOOK. How a Special Disability in Spelling was Diagnosed and Corrected 378
PAUL V. SANGREN. Comparative Validity of Primary Intelligence Tests 394
NEWS AND NOTES 413
BOOK REVIEWS 417
NEW BOOKS AND PAMPHLETS 423

PUBLISHED BI-MONTHLY BY THE EDITOR
All communications should be addressed to the Editor,
Ohio University, Athens, Ohio
Printed by
WAVERLY PRESS, INC.
Baltimore, Md.

Entered as second class matter June 3, 1924, at the post office at Baltimore, Maryland, under the act of March 3, 1879.
Acceptance for mailing at special rate of postage provided for in section 1103, act of October 3, 1917. Authorized December 31, 1923.

COPYRIGHT 1929, BY JAMES P. PORTER

The Journal of Applied Psychology

CO-OPERATING EDITORS

W. F. Book, Indiana University; W. V. Bingham, Personnel Research Federation, New York; June E. Downey, University of Wyoming; Robert H. Gault, Northwestern University; William Healy, Baker Foundation, Juvenile Court, Boston; H. L. Hollingworth, Columbia University; Joseph Jastrow, University of Wisconsin; Herbert S. Langfeld, Princeton University; James H. Leuba, Bryn Mawr College; Henry C. McComas, Princeton University; Walter D. Scott, Northwestern University; C. E. Seashore, University of Iowa; Daniel Starch, Boston, Mass.; Edward K. Strong, Jr., Leland Stanford Jr. University; L. M. Terman, Leland Stanford Jr. University; E. L. Thorndike, Columbia University; J. E. Wallace Wallin, Department of Education, Baltimore, Md.; G. M. Whipple, Danvers, Mass.; Helen Thompson Woolley, Teachers College, Columbia University.

The scope of The Journal of Applied Psychology will include the following: (a) The application of psychology to vocational activities, such as law, art, public speaking, industrial and commercial work, and problems of business appeals. (b) Studies of individual mentalities, such as types of character, special talents, genius, and individual differences, including the problems of mental diagnosis and vocational prognosis. (c) The influence of general environment conditions, such as climate, weather, humidity, temperature; also such conditions as nutrition, fatigue, etc. (d) The psychology of everyday activities, such as reading, writing, speaking, singing, playing games or playing musical instruments, sports, etc.

Communications, manuscripts, reviews, summaries, notices, books and off-prints for review should be addressed to Dr. James P. Porter, Ohio University, Athens, Ohio. Contributors are requested to follow the conventional method of citation employed by this Journal; in every case the year, volume and pages should be specified.

The Journal of Applied Psychology is published bi-monthly. The subscription price is $5.00 a year. Single numbers $1.00. Remittances and business communications should be addressed to the Editor, James P. Porter, Ohio University, Athens, Ohio.

INTERPOLATED REVISION OF COLLEGE ADULT-LEVEL NORMS FOR PERSONNEL PROCEDURE

F. RODNEY GILLESPIE AND R. A. BROTEMARKLE

University of Pennsylvania

In a study on College Student Personnel Problems, Brotemarkle published norms on some sixteen tests.[1] His norms were based on four hundred to two thousand cases. The present study adds from three hundred fifty to nine hundred cases to the former standards. It is the purpose of this paper to show the effect of adding cases to the former norms, present revised norms, and include norms for four additional tests.

The present study includes the revision of norms for the following thirteen tests: Memory Span Tests for Digits, Syllables and Ideas; Taylor Number Test; Roback Opposites Test; Roback Abstraction Test; Roback Reference Test; Roback Judgment Test; Roback Application Test; Brotemarkle Comparison Test; Healy-Bronner Learning Z Test; Courtis Arithmetic Test; Ferguson Form Boards Nos. 4, 5 and 6. The Trabue Language Scale is changed from J and K combined to to J Scale. K has been discontinued; and the J scale being slightly more difficult, gives a better range and distribution. The Adult Scaled Information Test,[2] constructed by Brotemarkle and Shimberg, supplant the Judge Baker Foundation Scaled Information Test.[3] Norms for the Healy Pictorial

[1] College Student Personnel Problems. Individual Mental Testing at the College-Adult Level. The Journal of Applied Psychology, Vol. XI, No. 6, December, 1927.

[2] Shortly to be presented in the literature. Tests may be secured at the present from R. A. Brotemarkle, 109 College Hall, University of Pennsylvania, Philadelphia, Pa.

[3] A Manual of Individual Mental Tests and Testing. Bronner, Healy, Lowe and Shimberg. Pages 57 and 188.

Completion Test II,[4] and the first and second trials of the Whipple-Healy Motor Tapping Test[5] are presented. It will be observed that the range and distributions for these tests are very good.

The following table presents a comparison of the former standards, added cases, and revised standards in percentile forms:

MEMORY SPAN TEST FOR DIGITS

	2092 cases Former standard	889 cases Additional results	2981 cases Revised standard
	Percentile	*Percentile*	*Percentile*
12—	100	100	100
11—	97.0	95.7	96.0
10—	90.1	89.3	89.2
9—	79.0	81.8	79.4
8—	56.6	58.6	56.8
7—	33.1	36.9	34.0
6—	14.1	14.4	14.1
5—	3.3	3.7	3.4
4—	0.2	0.2	0.2

MEMORY SPAN TEST FOR SYLLABLES

	1383 cases Former standard	917 cases Additional results	2300 cases Revised standard
	Percentile	*Percentile*	*Percentile*
50—	100	100	100
45—	99.1	99.5	99.4
40—	99.0	99.4	99.3
35—	96.7	97.1	97.0
30—	82.3	79.8	81.5
25—	18.5	23.4	20.5
20—	6.5	5.8	6.3
15—		0.2	0.5
10—	0.4	0.1	0.4

[4] Ibid., pages 52, 185.
[5] Ibid., pages 144, 225.

Memory Span Test for Ideas

	1293 cases Former standard	928 cases Additional results	2221 cases Revised standard
	Percentile	*Percentile*	*Percentile*
12—	100	100	100
11—	99.6	99.7	99.7
10—	98.7	99.3	99.0
9—	96.8	98.6	97.0
8—	93.5	95.0	94.2
7—	87.3	89.0	88.1
6—	78	79.1	78.5
5—	64.3	66.4	65.2
4—	48.9	49.6	49.2
3—	33.1	31.6	32.4
2—	20.6	18.4	19.7
1—	7.9	6.9	7.5
0—	1.5	1.5	1.5

Taylor Number Test

	730 cases Former standard	865 cases Additional results	1595 cases Revised standard
	Percentile	*Percentile*	*Percentile*
28—	100	100	100
27—			
26—	99.8	99.9	99.9
25—	99.5	99.8	99.7
24—	99.3	99.6	99.5
23—	98.7	99.5	99.2
22—	98.4	99.1	98.9
21—	97.8	98.9	98.6
20—	97	97.6	97.6
19—	95	95.5	95.5
18—	92	93.2	92.7
17—	87.3	88.3	87.9
16—	73.8	77.9	76.0
15—	70.8	72.6	71.7
14—	59.1	60.7	59.6
13—	52.3	54.2	53.3
12—	41.3	45.5	43.6
11—	28.7	32.3	30.6
10—	13.2	15.5	14.6
9—	8.3	9.5	8.9
8—	1.9	5.3	4.9
7—	1.8	3.5	3.3
6—	0.6	2.2	1.9
5—	0.6	1.4	1.2
4—	0.3	0.5	0.5
3—	0.2	0.5	0.4

ROBACK OPPOSITES TEST

	469 cases Former standard	443 cases Additional results	912 cases Revised standard
88—		100	100
86—			
84—			
82—	100		99.9
80—	99.8	99.8	99.8
78—	99.6	99.0	99.4
76—		97.7	98.7
74—	99.4	96.9	98.4
72—	98.7	96.1	97.7
70—	97.2	94.5	96.3
68—	94.7	93.9	94.3
66—	92.2	90.7	91.5
64—	89.0	88.7	88.9
62—	85.6	86.2	86.0
60—	80.9	80.1	80.6
58—	74.3	76.5	75.5
56—	68.1	70.2	69.3
54—	60.6	64.3	62.6
52—	54.0	56.2	55.2
50—	48.5	49.4	49.0
48—	42.1	43.5	42.8
46—	35.3	38.3	36.8
44—	28.9	33.6	31.2
42—	24.4	25.2	24.8
40—	19.7	20.7	20.2
38—	16.1	16.2	16.1
36—	12.9	12.8	12.8
34—	8.8	8.8	8.7
32—	6.5	5.4	5.9
30—	5.0	4.1	4.4
28—	3.5	2.5	3.0
26—	2.8	1.8	2.3
24—	1.3	1.1	1.2
22—	1.1	0.7	0.9
20—	0.4		0.6

ROBACK ABSTRACTION TEST

	462 cases Former standard	432 cases Additional results	894 cases Revised standard
93		100	100
90		99.8	99.9
88		99.3	99.7
86		99.1	99.6
85	100	98.4	99.3
83	98.6	97.9	98.9
81	98.3	97.7	98.1
80	98.1	97.0	97.7
78	97.2	95.1	96.3
77	96.1	93.9	95.2
76	95.0	93.7	94.5
75	94.6	91.8	93.4
73	94.0	88.3	91.4
72	92.7	86.4	89.8
71	91.0	86.2	88.8
70	90.4	84.1	87.4
68	89.3	80.2	84.9
67	87.1	77.9	82.7
66	84.5	75.1	80.0
65	84.3	72.1	78.4
64		69.8	76.3
63	82.3	66.8	74.9
62	80.1	62.2	71.5
61	78.8	59.9	69.7
60	77.9	56.9	67.8
59	76.4		64.4
58	76.2	51.6	64.3
57	73.4	47.7	60.9
56		46.8	59.7
55	71.9	43.8	58.3
54	70.2		54.4
53	69.8	37.5	54.2
52	68.3	34.2	51.8
51	67.0	31.7	49.8
50	66.4	29.6	48.5
49	64.4		45.9
48	63.5	26.3	45.5
47	60.2	23.3	42.4
46	57.4	22.1	40.4
45	55.9	19.3	38.3
44	53.5	16.0	35.5
43	50.5	15.8	33.8

ROBACK ABSTRACTION TEST—*Concluded*

	462 cases Former standard	432 cases Additional results	894 cases Revised standard
42	47.5	13.9	31.3
41	43.6	13.0	28.8
40	40.8	11.1	26.4
39	38.0		22.7
38	33.0	8.6	21.1
37	30.2	5.8	18.3
36	25.2	4.9	15.3
35	22.4	4.4	13.6
34	20.2		12.4
33	16.7	4.2	10.6
32	13.2	3.3	8.4
31	11.2	3.1	7.3
30	9.5	2.6	6.2
29	7.8		5.0
28	6.9	1.9	4.6
27	5.8	1.4	3.8
26	4.3	1.2	2.9
25	3.4	1.0	2.3
24	2.5		1.7
23	1.0		0.9
21	0.6	0.8	0.7
20		0.6	0.5
18		0.4	0.4
17	0.4		0.3
16		0.2	0.1

ROBACK REFERENCE TEST

	376 cases Former standard	427 cases Additional results	803 cases Revised standard
53—	100		100
52—	99.7		99.9
51—	99.4		99.8
48—	99.1		99.7
47—	98.8		99.6
46—	98.3		99.4
44—	97.8		99.2
43—	96.7		98.7
42—	95.9		98.3
41—	93.6	100	97.2
40—	92.3	99.5	96.3
39—	90.7	98.3	94.9

ROBACK REFERENCE TEST—*Concluded*

	376 cases Former standard	427 cases Additional results	803 cases Revised standard
38—	88.6	97.8	93.7
37—	86.5	97.3	92.5
36—	82.5	95.2	89.5
35—	77.7	92.6	85.9
34—	72.9	89.6	81.9
33—	66.5	85.6	76.8
32—	61.7	83.0	73.2
31—	54.5	77.4	66.8
30—	46.5	70.4	59.3
29—	40.9	63.4	52.9
28—	35.9	53.8	45.4
27—	30.3	46.4	38.8
26—	23.1	37.5	30.7
25—	14.9	29.5	22.6
24—	10.6	22.1	16.6
23—	8.5	16.7	12.6
22—	5.6	13.2	9.4
21—	4.0	8.5	6.2
20—	2.7	5.7	4.1
19—	1.9	4.3	3.0
18—	0.8	2.4	1.5
17—	0.3	1.7	0.9
15—		1.2	0.5
14—		0.7	0.3
10—		0.5	0.2

ROBACK JUDGMENT TEST

	398 cases Former standard	355 cases Additional results	753 cases Revised standard
	Percentile	*Percentile*	*Percentile*
88—	100		100
85—	99.8	100	99.9
83—	99.3	99.4	99.4
82—	98.5	99.1	98.9
80—	97.5	98.5	98.1
78—	95.7	96.8	96.4
77—	91.9	95.1	93.6
76—	88.1	94.0	91.1
75—	86.6	92.9	89.8
73—	82.8	91.8	87.3
72—	78.3	89.8	84.0
71—	73.8		81.2

ROBACK JUDGMENT TEST—*Concluded*

	393 cases Former standard *Percentile*	355 cases Additional resu *Percentile*	753 cases Revised standards *Percentile*
70—	70.3	89.0	79.3
68—	65.0	85.9	75.0
67—	61.0	82.5	71.3
66—	56.7	81.1	68.4
65—	55.7	79.4	67.1
64—	48.9	75.7	62.3
63—	48.7	75.4	62.0
62—	44.4	70.0	56.7
61—	40.6	68.0	53.8
60—	38.3	65.7	52.1
59—	33.7	59.8	46.4
58—	33.2	59.5	46.0
57—	26.9	53.3	39.7
56—	21.9	51.3	36.1
55—	20.9	48.5	34.2
53—		44.6	30.0
52—	16.6	40.2	27.9
51—	14.1	38.8	25.9
50—	13.4	37.1	24.7
48—	10.1	32.3	20.7
47—	8.1	29.8	18.3
46—		26.7	15.5
45—	5.6	24.4	14.4
44—		21.9	12.7
43—	4.6	21.3	12.4
42—	3.9	19.6	11.2
41—		17.1	9.6
40—	3.2	15.4	8.8
39—		13.1	7.2
38—	2.2	12.8	7.1
37—		11.4	6.2
36—	1.7	10.6	5.8
35—	1.5	9.5	5.1
34—		8.1	4.2
33—	1.0	6.4	3.4
32—		5.0	2.2
31—		3.9	1.7
30—		3.1	1.3
29—		2.8	1.2
28—		2.0	0.8
27—		1.7	0.7
25—		0.9	0.3
18—		0.6	0.2
17—		0.3	0.1

ROBACK APPLICATION TEST

	432 cases Former standard *Percentile*	359 cases Additional results *Percentile*	791 cases Revised standard *Percentile*
93—	100		100
90—	99.8		99.9
87—	99.6		99.8
83—	99.4		99.7
80—	99.2	100	99.6
77—	98.7	99.7	99.2
76—		99.4	98.6
73—	97.8	99.1	98.5
72—		98.8	97.0
70—	95.2	98.5	95.9
67—	90.1	98.2	94.0
66—		97.4	91.2
65—		97.1	91.1
63—	85.7	96.5	90.8
60—	81.1	94.6	87.4
58—		90.2	82.0
57—	74.8	89.9	81.9
56—		88.0	78.2
54—		86.6	77.6
53—	69.7	85.2	77.0
52—		82.7	72.8
51—		82.4	72.7
50—	64.1	82.1	72.6
48—		74.9	65.1
47—	56.4	74.1	64.7
46—		70.5	59.3
45—		68.8	58.5
44—		68.5	58.4
43—	49.4	67.7	58.0
42—		60.2	49.3
41—		58.8	48.7
40—	39.7	58.2	48.4
37—	31.4	49.6	39.9
36—		44.6	33.2
34—		40.7	31.4
33—	23.3	39.9	31.0
32—		34.3	25.3
30—	17.5	34.0	25.2
28—		26.2	18.4
27—	11.5	25.4	18.0

ROBACK APPLICATION TEST—*Concluded*

	432 cases Former standard *Percentile*	359 cases Additional results *Percentile*	791 cases Revised standard *Percentile*
26—		21.2	14.8
24—		19.8	14.2
23—	9.2	18.1	13.4
21—		12.8	9.7
20—	6.9	12.5	9.6
18—		7.8	6.4
17—	5.1	7.0	6.0
16—		5.1	4.0
13—	3.0	4.5	3.7
10—		3.1	2.3
7—	1.6		1.0
0		0.3	0.1

BROTEMARKLE COMPARISON TEST

	915 cases Former standard	753 cases Additional results	1668 cases Revised standard
6—		100	100
8—	100	99.9	99.9
10—		99.0	98.8
12—		96.6	96.5
14—	92.8	93.0	92.9
16—	88.8	87.9	88.4
18—	78.1	77.4	77.9
20—	70.7	68.0	69.6
22—	60.1	55.6	58.3
24—	53.8	45.8	48.6
26—	40.9	36.6	39.3
28—	34	29.1	32.1
30—	26.8	21.9	24.9
32—	20.6	15.6	18.6
34—	15.6	12.3	14.4
36—	11.4	9.0	10.6
38—	8.2	6.4	7.8
40—	6.5	4.7	6.1
42—	4.3	3.0	4.2
44—	3.0	2.5	3.3
46—	2.3	2.2	2.8
48—	1.8	1.5	2.2

BROTEMARKLE COMPARISON TEST—*Concluded*

	915 cases Former standard	753 cases Additional results	1668 cases Revised standard
50—	1.4	1.0	1.7
52—	1.1	0.9	1.5
54—			
56—	0.7		1.0
58—	0.6	0.4	0.9
60—	0.4		0.7
62—	0.3		0.6
64—	0.2		0.5
66—			
68—	0.1		0.4
70—			
72—		0.3	0.3
82—		0.2	0.2
94—		0.1	0.1

LEARNING Z TEST

Healy-Bronner

	403 cases Former standard	370 cases Additional results	773 cases Revised standard
54—	100	100	100
53—	95.8	91.9	93.9
52—	94.1	88.9	91.7
51—	91.4	85.4	88.5
50—	88.4	79.9	84.4
49—	84.7	75.0	80.1
48—	79.7	69.9	75.1
47—	74.7	63.7	69.6
46—	69.7	59.1	64.8
45—	63.2	53.4	58.7
44—	59.0	48.3	54.0
43—	54.0	45.6	50.1
42—	51.0	40.1	46.0
41—	47.3	36.1	42.1
40—	41.9	33.4	38.0
39—	37.4	30.4	34.1
38—	34.2	28.2	31.4
37—	32.2	26.6	29.6
36—	30.2	23.9	27.3
35—	27.0	22.3	24.9
34—	23.8	20.7	22.5

LEARNING Z TEST—*Concluded*

	403 cases Former standard	370 cases Additional results	773 cases Revised standard
33—	20.6	18.5	19.8
32—	16.4	15.5	16.2
31—	14.2	13.9	14.2
30—	12.7	12.0	12.5
29—	10.5	10.4	10.5
28—	9.0	8.8	9.0
27—	7.5	7.7	7.7
26—	6.0	6.9	6.5
25—	5.2	6.1	5.7
24—	4.4	5.6	5.1
23—	3.4	5.1	4.3
22—	2.9	4.0	3.5
21—	2.1	2.9	2.6
20—	1.1	2.6	2.0
19—	0.9	2.1	1.6
18—		1.6	1.2
17—		1.3	1.1
16—	0.7		1.0
15—		1.0	0.7
12—	0.2		0.4
11		0.5	0.3

COURTIS ARITHMETIC TEST
(Series A, Form 3, Test 7)

	420 cases Former standard	372 cases Additional results	792 cases Revised standard
19 —	100	100	100
18.5—			
18 —	98.3	98.3	98.5
17.5—		97.1	97.4
17 —	97.1	96.8	97.3
16.5—	93.5	90.6	92.2
16 —	93	89.5	91.4
15.5—	89.4	84.6	87.1
15 —	88.5	83.9	86.3
14.5—	82.8	75.5	79.3
14 —	77.4	75	76.1
13.5—	71.7	66.9	68.9
13 —	69.8	65	67.1
12.5—	61.3	56.9	58.9

COURTIS ARITHMETIC TEST—*Concluded*

	420 cases Former standard	372 cases Additional results	792 cases Revised standard
12 —	60.8	55.6	58.0
11.5—	52.3	46.2	49.1
11 —	50	44.3	47.0
10.5—	39.3	37.6	38.1
10 —	38.1	36.8	37.1
9.5—	31.1	28.7	29.6
9 —	29.7	27.6	28.3
8.5—	21.9	23.3	22.2
8 —	19.8	21.2	20.1
7.5—	12.8	13.7	12.9
7 —	11.4	11.5	11.2
6.5—	6.2	6.9	6.3
6 —	5.7	5.4	5.0
5.5—	4.3	3.0	3.3
5 —	3.1	2.1	2.3
4.5—	1.4	1.5	1.2
4 —	0.9	1.2	0.8
3.5—	0.6	0.9	0.6
3 —	0.3	0.6	0.4

WITMER CYLINDER TEST

494 cases

Score	*Percentile*	*Score*	*Percentile*
23–31—	100	50– —	47.7
32–34—	94.6	51–53 —	43.5
35–36—	90.2	54–57 —	39.3
37– —	84.5	58–61 —	34.3
38– —	80.8	62–66 —	29.3
39– —	77.8	67–73 —	24.3
40– —	74.6	74–85 —	19.6
41– —	70.9	86–100—	14.4
42– —	67.7	101–136—	9.2
43–45—	62.3	137–F (180+)	4.2
46–49—	55.6		

FERGUSON FORM BOARD NO. 4

431 cases Former standard	194 cases Additional results	625 cases Revised standard	*Percentile*
27–41	28–36	27–40	100
42–48	37–40	41–46	95
49–53	41–46	47–51	90
54–58	47–50	52–55	85

FERGUSON FORM BOARD NO. 4—*Concluded*

431 cases Former standard	194 cases Additional results	625 cases Revised standard	*Percentile*
59–62	51–53	56–60	80
63–67	54–56	61–64	75
68–70	57–60	65–69	70
71–77	61–64	70–74	65
78–81	65–69	75–80	60
82–85	70–72	81–84	55
86–91	73–77	85–90	50
92–95	78–84	91–94	45
96–104	85–88	95–102	40
105–112	89–95	103–110	35
113–121	96–106	111–118	30
122–134	107–115	119–129	25
135–155	116–127	130–149	20
156–185	128–137	150–181	15
186–234	138–184	182–233	10
234–F (300)	185–F (300)	234–F (300)	5

FERGUSON FORM BOARD NO. 5

431 cases Former standard	194 cases Additional results	625 cases Revised standard	*Percentile*
40–57	32–52	32–57	100
58–66	53–60	58–64	95
67–73	61–65	65–70	90
74–79	66–70	71–76	85
80–86	71–76	77–83	80
87–91	77–81	84–89	75
92–97	82–89	90–95	70
98–106	90–95	96–101	65
107–115	96–100	102–108	60
116–120	101–104	109–115	55
121–127	105–110	116–120	50
128–137	111–115	121–131	45
138–145	116–123	132–140	40
146–162	124–139	141–151	35
163–179	140–157	152–169	30
180–193	158–161	170–183	25
194–223	162–180	184–202	20
224–248	181–203	203–242	15
249–299	204–255	243–294	10
F (300)	256–(F 300)	295–(F 300)	5

Ferguson Form Board No. 6

431 cases Former standard	194 cases Additional results	625 cases Revised standard	*Percentile*
42–70	41–61	41–69	100
71–85	62–77	70–80	95
86–99	78–86	81–96	90
100–113	87–97	97–109	85
114–129	98–112	110–123	80
130–141	113–126	124–137	75
142–152	127–140	138–147	70
153–172	141–160	148–166	65
173–187	161–177	167–183	60
188–200	178–193	184–195	55
201–215	194–210	196–210	50
216–237	211–232	211–230	45
240–263	233–250	231–256	40
264–295	251–264	257–282	35
296–F	265–297	283–F (300)	30
	298–F		25
			20
			15
			10
F	F	F	5

Healy Completion Test II

553 cases

Score	*Percentile*	*Score*	*Percentile*
100—	100	84—	90.8
99—	98.9	83—	90.3
98—		82—	89.0
97—	98.7	81—	87.7
96—	98.5	80—	87.0
95—	98.3	79—	86.3
94—		78—	83.8
93—	97.0	77—	82.2
92—		76—	80.6
91—	96.1	75—	79.5
90—	95.7	74—	78.2
89—		73—	74.6
88—	95.5	72—	71.7
87—	94.6	71—	70.4
86—	92.8	70—	68.4
85—	91.7	69—	66.6

HEALEY COMPLETION TEST II—*Concluded*

Score	*Percentile*	*Score*	*Percentile*
68—	64.1	44—	12.2
67—	60.9	43—	10.9
66—	58.6	42—	9.3
65—	56.1	41—	7.9
64—	52.9	40—	7.2
63—	50.7	39—	6.8
62—	48.4	38—	5.7
61—	46.1	37—	
60—	45.0	36—	4.6
59—	41.0	35—	4.1
58—	39.0	34—	3.4
57—	36.8	33—	3.2
56—	35.7	32—	2.8
55—	32.6	31—	
54—	30.3	30—	2.4
53—	27.0	29—	2.0
52—	25.1	28—	1.6
51—	21.7	27—	1.4
50—	21.0	26—	1.2
49—	19.0	25—	
48—	18.1	24—	1.0
47—	16.5	23—	0.8
46—	14.9	22—	
45—	13.5	21—	0.6
		20—	0.4

HEALY MOTOR TAPPING TEST (FIRST TRIAL)

370 cases

Score	*Percentile*	*Score*	*Percentile*
142—	100	119—	87.6
136—	99.8	118—	84.6
133—	99.6	117—	83.2
130—	99.4	116—	81.3
128—	97.5	115—	79.1
127—	96.2	114—	76.4
126—	95.4	113—	74.2
125—	94.3	112—	71.7
124—	93.8	111—	70.3
123—	93.0	110—	66.5
122—	92.2	109—	65.1
121—	90.6	108—	61.6
120—	89.0	107—	59.4

HEALEY MOTOR TAPPING TEST (FIRST TRIAL)—*Concluded*

Score	*Percentile*	*Score*	*Percentile*
106—	57.8	86—	18.8
105—	56.2	85—	16.6
104—	51.9	84—	14.4
103—	49.7	83—	13.0
102—	47.0	82—	12.8
101—	44.0	81—	11.2
100—	42.1	80—	10.4
99—	39.6	79—	9.0
98—	36.6	78—	7.9
97—	34.7	77—	5.7
96—	32.8	75—	4.9
95—	29.8	74—	4.7
94—	27.6	73—	4.2
93—	26.8	72—	3.4
92—	25.4	70—	2.3
91—	24.3	67—	1.2
90—	22.1	66—	1.0
89—		64—	0.8
88—	21.0	61—	0.6
87—	20.2	58—	0.4
		42—	0.2

HEALY MOTOR TAPPING TEST (SECOND TRIAL)

370 cases

Score	*Percentile*	*Score*	*Percentile*
143—	100	123—	90.0
141—	99.7	122—	89.2
140—	99.4	121—	87.3
139—	99.1	120—	86.8
138—	98.8	119—	83.8
136—	98.3	118—	80.5
135—	97.8	117—	77.5
134—	97.5	116—	74.5
133—	97.2	115—	70.7
132—	96.1	114—	68.0
130—	95.8	113—	65.0
129—	95.3	112—	62.6
128—	94.8	111—	60.5
127—	94.3	110—	58.6
126—	92.7	109—	55.1
125—	91.9	108—	53.0
124—	91.4	107—	50.9

HEALEY MOTOR TAPPING TEST (SECOND TRIAL)—*Concluded*

Score	*Percentile*	*Score*	*Percentile*
106—	49.5	91—	14.8
105—	47.4	90—	12.4
104—	45.3	89—	11.0
103—	43.7	88—	9.9
102—	40.7	87—	8.5
101—	37.2	86—	7.4
100—	35.1	85—	6.6
99—	30.5	84—	5.5
98—	28.9	83—	5.0
97—	25.9	82—	3.1
96—	24.8	77—	2.3
95—	22.4	74—	2.0
94—	21.0	67—	0.9
93—	19.4	66—	0.6
92—	17.5	53—	0.3

TRABUE LANGUAGE SCALE J

496 cases

Score	*Percentile*	*Score*	*Percentile*
14—	100	8—	23.7
13—	99.8	7—	8.8
12—	97.8	6—	2.8
11—	89.7	5—	
10—	66.9	4—	0.2
9—	42.5		

BROTEMARKLE-SHIMBERG INFORMATION TEST

365 cases

Score	*Percentile*	*Score*	*Percenti*
19—	100	10—	18.9
18—	99.3	9—	9.6
17—	95.5	8—	5.8
16—	90	7—	3.3
15—	81.8	6—	1.7
14—	68.9	5—	
13—	57.2	4—	
12—	43.8	3—	0.3
11—	32.1		

Table 1 will facilitate an analysis of the effect of additional cases on the existing norms. NC indicates no significant change; three divisions of the range are observed, approximating the upper, middle or lower tertile. Numbers indicate the amount of

TABLE 1

TESTS	FORMER CASES	ADDITIONAL CASES	CHANGE NOTED			NATURE OF RANGE
			Upper range	Middle range	Lower range	
Memory Span Test for Digits	2092	889	NC	NC	NC	N
Memory Span Test for Syllables	1383	917	NC	NC	NC	N
Memory Span Test for Ideas	1293	928	NC	NC	NC	N
Taylor Number Test	730	865	NC	NC	NC	M
Roback Opposites Test	469	443	NC	NC	NC	M
Roback Abstraction Test	462	432	−1–8	−10–15	−0.1–10	W
Roback Reference Test	376	427	+0.2–8	−8–12	+0.2–8	M
Roback Judgment Test	398	355	+0.1–9	+10–14	+4–13	W
Roback Application Test	432	359	+0.1–8	+8	+0.3–8	W
Brotemarkle Comparison Test	915	753	NC	NC	NC	M
Healy-Bronner Learning Z Test	403	370	−2–5	−3–5	NC	M
Courtis Arithmetic Test	420	372	NC	−1–3	NC	N
Witmer Cylinder Test			*			M
Ferguson Form Board No. 4	431	194	+1–3†	+1–3	+1–6	W
Ferguson Form Board No. 5	431	194	+2–3†	+5–7	+6–20	W
Ferguson Form Board No. 6	431	194	+1–6†	+4–8	+7–13	W

* No additional cases. Change to smaller percentile units.

† Change in seconds—not percentiles as above.

change in percentiles of the tertile range. Plus (+) indicates raising and minus (−) lowering of the revised standards. N, M, and W, Narrow, Medium and Wide, refer respectively to the nature of the spread or range of distribution.

Certain observations may be made upon the basis of the interpolated revision of the norms presented. Where the range is narrow, as in the Memory Span Tests, one thousand cases seem adequate for the establishment of norms. Where the distribution is medium, five hundred cases will give approximate norms, and additional cases will result in only slight variation; a thousand cases may give adequate norms. Where the scatter is wide five hundred cases is insufficient to give reliable norms and additional cases will bring about significant changes. In the case of such tests, these later changes occur throughout the entire range of distribution.

The interpolations presented have a definite bearing upon the theory of test standardization. The evidence contained therein seems to substantiate the commonly accepted theory of adequate standardization upon the basis of a reasonably small number of results. The interpolation of additional results should give evidence upon which to formulate the theory of adequate standardization.

The authors will continue the development of adequate norms, feeling that the successful use of the mental-graph, or individual tests in Personnel Procedure depends largely upon a "well standardized percentile distribution." They desire, however, to re-emphasize the necessity of the clinical analysis and interpretation of test results upon the basis of a broad clinical experience. The function of the Personnel Officer is to aid the student in the adjustment of individual problems and the development of personality. He must discover as far as possible the specific problems which deter the student in academic success. To this end the individual student personnel procedure is divided into two parts: the one concerned with mental-analysis; the other with personal interviews. Certainly specific mental abilities, be they favorable or unfavorable, cannot be detected by mere statistics, much less by an interview. In

view of this, attention is directed to the qualitative aspect of the mental test interpretation.

Through such analyses the Personnel Office may more definitely understand the problem involved in academic success or failure and the objective nature of the material is found to be of greater weight with the student. What numerous interviewers have pointed out to him in a general way, with little convincing effect, may be demonstrated in the objective test materials used. This is true not only of specific scholastic capacities or deficiencies, but of the method of approach and application of these in the student's problems of study.

The development of such procedure and the basic test norms is tedious and slow. The development of personnel procedure may be retarded somewhat by the establishment of these norms and the gaining of clinical experience, but the goal object of personnel procedure will be the higher.

THE HISTORICAL TREND OF NEGATIVE APPEALS IN ADVERTISING

D. B. LUCAS

Rutgers University

AND

C. E. BENSON

New York University

The controversy over the use of negative appeals in advertising is one of long standing. THE JOURNAL OF APPLIED PSYCHOLOGY recently[1] carried an article based on a coupon comparison of positive and negative advertising appeals conducted by the authors. In this study it was found that positive and negative appeals are about equally effective in advertising the goods represented. The following is a report of the results of a historical investigation of the trend in the use of negative advertising appeals. The historical method of approach to advertising problems has a prominent exponent in Dr. Harry D. Kitson of Columbia University. He has devoted the entire volume on Scientific Advertising to the historical method. The authors are obligated to Dr. Kitson for the general technique used. Because of the acute significance which is at present attached to trends in business practices, the results of this study should serve to confirm or deny the conclusions on the previous coupon comparison.

In advertising, as in other phases of business, it is obvious that the methods which survive and are retained must be those which are most profitable. Other things being equal it would seem that an increase or a decrease in the proportion of negative appeal advertising used might indicate the relative success

[1] June, 1929.

accompanying its use. The purpose of this study was to discover whether advertisers have found the use of negative appeals to be profitable.

DEFINITION

Any appeal to human motivation involves either a desire for attainment or an impulse to avoid. All appeals to attainment may be called positive, while appeals to avoidance are negative. A negative advertising appeal is then an attempt to stimulate the reader to the avoidance of a repulsive situation.

THE METHOD OF PROCEDURE

Three well known American magazines were selected as the sources of the material for the study. The amount of negative advertising was determined for representative periods at regular intervals. The variations in the use of negative advertisements from one period to the next were taken as an indication of the trend for the entire time studied.

The range of commodities studied included only a few general classes of goods. These goods had been selected because of their adaptability to other phases of a more extensive investigation comparing positive and negative appeals. No class of products was included which had not at some time used both positive and negative advertising appeals. The limitation of the kinds of goods should eliminate much of the error owing to the constant changing of the products advertised. Certain products are acquiring a rapidly increasing proportion of the advertising space in magazines. Automobiles and accessories, for example, have only recently claimed an enormous share of the general magazine advertising space. The exclusion of such commodities should reduce the influence of such predominant changes insofar as they affect this study. Advertisements representing the following types of goods intended for human use were accepted:

1. Food products and beverages.
2. Toilet articles.
3. Proprietary medicines, medical articles and other goods for medicinal purposes.
4. Articles used for the purpose of personal sanitation.

Because of their prominence the following magazines were selected as sources of data for this study:

The Literary Digest
The Saturday Evening Post
The Ladies' Home Journal

The historical data were obtained for the period from 1912 to the present time. This particular group of years was selected because the main concern of this study is with modern practices. Starch has expressed the view that the truly scientific stage in commercial advertising became evident in about the year 1911.[2] At that time the business of advertising began to expand with renewed vigor until American advertising has attained the present tremendous proportions of a billion and a half dollar business.

Following the technique used by Kitson[3] the data were obtained from the magazine issues for six consecutive months at intervals of five years. In order to bring the results strictly up to date, 1927 was selected as the final year. Going back at five year intervals, the years 1912, 1917 and 1922 were found to fall within the scientific modern era in advertising. The figures to be reported represent the issues of the three magazines for the first six months of each of the four years mentioned.

In order to exclude the great number of small advertisements the data are limited to those covering one fourth page or more. It is obvious that a tiny one or two line advertisement could not well be given the same weight as an elaborate advertisement covering as much as two pages. The elimination of such material accounts only for the variations below one fourth page, but is one added step in equalizing the many factors. It will be obvious in the data that most of the advertisements were of sufficient size to have an illustration as well as a headline and discussion.

[2] Starch, Principles of Advertising, p. 16.
[3] Kitson, Scientific Advertising, p. 58.

CLASSIFICATION OF THE ADVERTISEMENTS

The classification of each of the advertisements was done by two individuals, independently of each other. The appeals were grouped according to whether they were essentially positive, neither positive nor negative, essentially negative and partially negative. There is but slight chance for error in determining when an advertisement is distinctly and directly negative in appeal. The authors found an agreement in 96.67 per cent of the cases in an unpublished study of the accuracy of classification of extreme examples of positive and negative appeals. Likewise, the introduction of negative appeal as a part of the advertisement is easily detected. There is a considerable possibility of error, however, in ascertaining whether the advertiser intends or establishes a positive appeal when he illustrates and discusses his product, or is mainly concerned with keeping the product in prominence. Because of this uncertainty, only the data indicating the trend in the use of negative advertisements will be presented. As a further reason it should be recalled that most of the criticism made by psychologists is directly against negative appeals rather than in favor of positive appeals. The conclusions as to the trend in the use of negative appeal advertising will be based on the number of essentially negative advertisements because they are comparatively easy to study with accuracy. In cases where the negative appeal was only used in a small part of the advertisement it was listed as "partially negative" but will be omittted from this report for the reason just given.

The illustration, headlines and text may differ as to whether they are positive or negative in appeal. In order to study the trends with respect to each of these parts of advertisements, they were all analyzed as to the type of illustration, headline and text. The trends of these various phases should serve to corroborate the results for the entire advertisements considered as complete units.

RESULTS OF THE STUDY

Table 1 shows the data obtained from three magazines to indicate the modern trend in the use of negative appeal advertisements.

TABLE 1

The use of negative advertisements in three magazines, 1912 to 1927

YEAR	LITERARY DIGEST			SATURDAY EVENING POST			LADIES' HOME JOURNAL			AVERAGE PER CENT NEGATIVE
	Number of ads	Number negative	Per cent negative	Number of ads	Number negative	Per cent negative	Number of ads	Number negative	Per cent negative	
Entire advertisement										
1912	106	13	12.3	261	10	3.8	191	15	7.9	8.0
1917	141	18	12.8	285	23	8.1	218	21	9.6	10.2
1922	155	18	11.6	390	33	8.5	399	39	9.8	10.0
1927	162	57	35.2	508	61	12.0	553	61	11.0	19.4
Illustrations										
1912	103	3	2.9	256	7	2.7	190	1	.5	2.0
1917	134	7	5.2	282	12	4.3	218	8	3.7	4.4
1922	154	12	7.8	386	23	6.0	399	11	2.8	5.5
1927	161	30	18.6	502	35	7.0	552	28	5.1	10.2
Headlines										
1912	104	12	11.5	261	12	4.6	180	5	2.8	6.3
1917	138	20	14.5	285	24	8.4	217	21	9.7	10.9
1922	155	18	11.6	388	32	8.2	391	37	9.5	9.8
1927	161	60	37.2	506	69	13.6	548	74	13.5	21.4
Text										
1912	91	15	16.5	256	9	3.5	175	24	13.7	11.2
1917	131	24	18.3	278	30	10.8	210	23	10.9	13.3
1922	146	21	14.4	371	36	9.7	388	50	12.9	12.3
1927	155	57	36.8	506	64	12.6	552	64	11.6	20.3

CONCLUSIONS FROM THE HISTORICAL SURVEY

The historical data and graphs show that there is no tendency to decrease the amount of negative appeal in magazine adver-

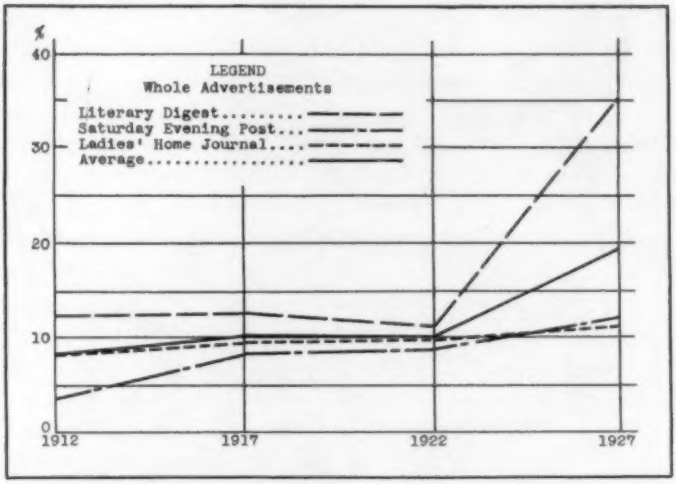

FIG. 1. PER CENT OF ADVERTISEMENTS WHICH WERE DISTINCTLY NEGATIVE IN THREE MAGAZINES DURING THE PERIOD FROM 1912 TO 1927

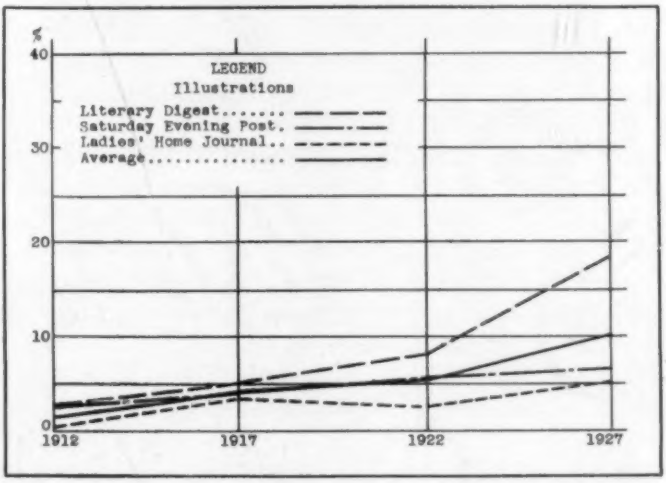

FIG. 2. PER CENT OF ADVERTISEMENTS HAVING DISTINCTLY NEGATIVE ILLUSTRATIONS IN THREE MAGAZINES DURING THE PERIOD FROM 1912 TO 1927

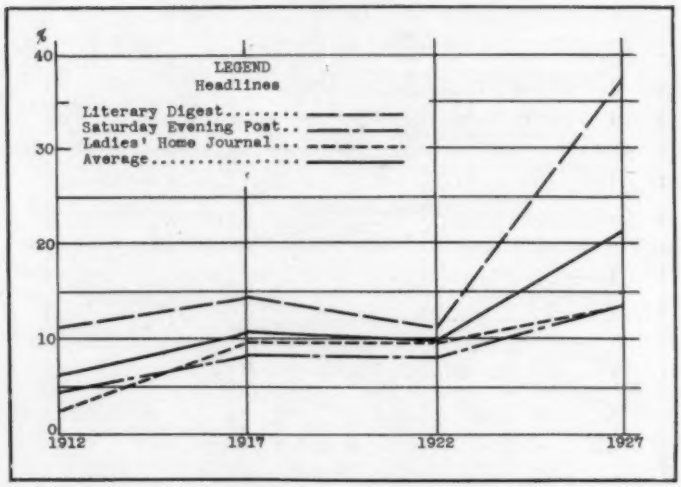

FIG. 3. PER CENT OF ADVERTISEMENTS HAVING DISTINCTLY NEGATIVE HEADLINES IN THREE MAGAZINES DURING THE PERIOD FROM 1912 TO 1927

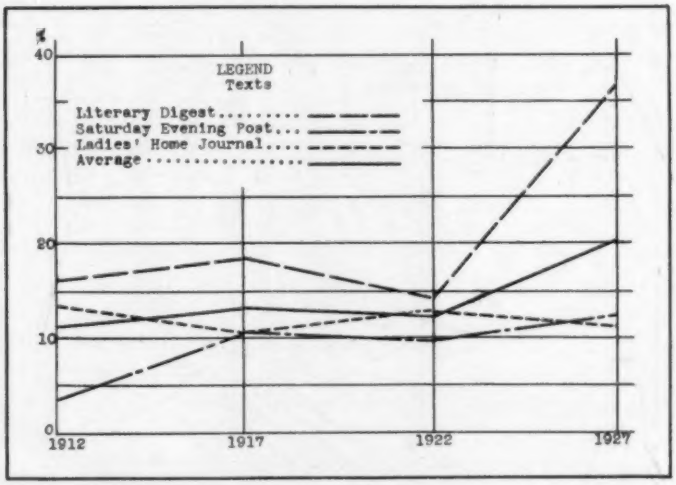

FIG. 4. PER CENT OF ADVERTISEMENTS HAVING DISTINCTLY NEGATIVE TEXTS IN THREE MAGAZINES DURING THE PERIOD FROM 1912 TO 1927

tising for the products studied. In fact it would seem that the present tendency is toward an increase in the use of negative appeal advertisements. *The Literary Digest* especially shows a decided increase in negative for the year 1927. *The Saturday Evening Post* and *Ladies' Home Journal* show a lesser but equally consistent increase in negative advertising.

The data for illustrations, headlines and text bring out certain points with regard to the use of negative in each part of the advertisement. The use of negative illustrations was formerly less common than negative headlines and texts, but was found to increase much more rapidly. The increase in negative headlines has kept pace with the increase in essentially negative advertisements. (See figs. 1 and 3.) There does not appear to be much increase in the use of negative discussion in the text except in the *Literary Digest*. (See fig. 4.)

NEGATIVE SUGGESTIONS IN ADVERTISEMENTS

Kitson has recently made a historical investigation of the trend in the use of negative suggestions in advertisements.[4] According to his definition, "A negative suggestion was rigidly construed as (*a*) a phrase containing 'no,' 'none,' 'nothing' or 'not;' (*b*) the mention of any act on the part of the buyer which would deny the use of the commodity advertised, e.g., 'Do not wear yourself out by sweeping.' (*c*) the allusion, by word or illustration, to any article competing with the one being advertised." Neither the definition nor the results of Kitson's study are wholly in agreement with the material presented here. Negative suggestions were found to be declining to an almost negligible usage by 1920. Kitson concluded that "These results . . . . give basis for condemning the use of negative suggestions . . . . " and that, ". . . . advertisers have found it increasingly profitable to reduce the number of negative suggestions . . . . "

Kitson has made a thorough and conclusive presentation of the facts about the use of negative suggestions. Negative

[4] Kitson, Scientific Advertising, p. 58.

An Appeal to Parents

protect the cuts and bruises of your youngsters from

THE GRAY SPECTER OF INFECTION

Mothers . . . an infected cut may be more dangerous than measles or croup.

Every mother should know that an infected cut is fraught with grave possibilities.

For the poison in an infected wound is not local in its lurking dangers . . . If it seeps into the system, as it often does, it may cause high fever, nausea, general debility and weeks of bedridden illness.

And no wound is so tiny that it may safely be considered free from infection's menace. Lockjaw has developed from a pin prick. Slight abrasions have led to loss of limb and lifelong scars.

The pity of it is, that these infections are usually so needless. Promptness in proper dressing of the wound will safeguard minor hurts from infection's dangers.

A moment to sterilize the wound with a mercurochrome swab or iodine swab. Another moment to cover it with sterile gauze and sterile gauze bandage . . . fastened with adhesive plaster. Thus, in a jiffy and for a few cents, you have secured the soundest of all health insurance policies.

These Bauer & Black Sterile First Aid products, in individual packages . . . or in kits and cabinets for home, travel, factory and hospital use, may be had at small cost in 45,000 drug stores. And they should be kept in the home, at all times . . . instantly available for the emergency.

First Aid to be effective must be prompt. Accident sends out no "advance notices" of its arrival. It is better to be ready than regretful.

* * *

4 simple things-to-do to prevent infection in cuts and bruises. 1 *Sterilize the wound with Bauer & Black Mercurochrome Swab or Iodine Swab . . .* 2 *When antiseptic is dry, cover with Bauer & Black Sterile Gauze . . .* 3 *Bind with Bauer & Black Sterile Gauze Bandage . . .* 4 *Fasten with Bauer & Black Adhesive Plaster.*

BAUER & BLACK
CHICAGO · NEW YORK · TORONTO

FIG. 5. THE USE OF CLEAR-CUT NEGATIVE APPEAL ADVERTISING IS FAR FROM BEING ABANDONED IN PRESENT DAY PRACTICE

suggestions have so much in common with general negative appeals that it is appropriate to point out the similarities in the results of the two studies. During the period in which the two historical investigations overlapped there is considerable agreement in the results. Kitson found the greatest decrease in negative suggestions in the years preceding the records presented here. The present study showed the greatest increase in negative appeals in the years following the completion of Kitson's study in 1920. There was no marked trend, either upward or downward, in the years from 1912 to 1920 which were included in both studies. Furthermore, it is entirely possible that "Allusions to competing articles" and other forms of negative suggestions have declined in usage while negative appeals in general have increased. Whether or not Kitson's results can be considered as corroborative evidence favoring the data presented here, it is highly important information on one phase of negative advertising.

There is one distinction between negative suggestions and negative appeals to motivation which is essential to a complete understanding of the problem. Psychologists can show in a theoretical way that the negative suggestion, "do not," is less effective than the positive suggestion, "do." It is quite obvious that "not doing" one thing does not insure the "doing" of that which is wanted. The admonition, "Don't let your teeth go" fails to carry the direct suggestion of, "Start at once to check Acid-mouth." The positive statement is more suggestive of the desired action than is the negative caution. Thus far the theoretical argument appears sound and logical. But the fact is that negative appeals are as apt to be closed with a 'positive' suggestion as are positive appeals. The statement, "Begin using Pebeco today" is as appropriate following the negative quotation above as it is following the positive. The total advertisement carries the definite suggestion to buy the advertised product through the use of the words "Begin using Pebeco today." Whole appeals are seldom dependent on one unsupported suggestion. It is as regular for a negative appeal to be accompanied by a suggestion to buy the specific product ad-

vertised as for any other type of appeal. The essential association is that between the desired situation and the brand of goods advertised.

SUMMARY OF CONCLUSIONS

The following points seem to be evident from the data on the trend in the use of negative appeal advertising:

1. The most recent trend in the use of negative appeal advertising for certain classes of goods appears to show an increase. There has been no rapid decrease in the use of negative at any time during the period since 1912.

2. The two studies here discussed show some differences which may be owing to the fact that the data for the present study represented only certain classes of goods. This would emphasize the need for separate consideration of the use of negative with each individual product or type of product.

3. Illustrations, headlines and texts show different trends in modern advertising and, therefore, should be given separate consideration from the standpoint of advertising appeals.

4. Since advertising is a phase of business and since advertising is becoming increasingly negative in appeal, it would appear that negative appeal advertising is profitable.

5. The results of this study do not show the trend in the use of strictly positive appeals over the same period. Positive appeals may have fluctuated independently of the negative, although the authors have observed an increase in both types coincident with the advent of the universal use of personal appeals.

MANUAL MOTOR CORRELATION IN SUPERIOR CHILDREN[1]

FRIEDA A. KIEFER, PH.D.

American Foundation for the Blind, and Perkins Institution
Watertown, Massachusetts

Few intensive studies have been reported of children of superior mental ability having difficulty in motor activities, especially manual dexterity. Many instances, however, of such children are found in psychological literature. The problem of this investigation is: (1) To what extent are the performances of children of superior intelligence comparable with those of children of average intelligence in a series of manual motor tests? (2) Will the results of this investigation furnish any evidence in the training of superior children along lines involving motor abilities?

The solution of this problem is considered under the following divisions:

Part I summarizes the literature with respect to the cases of superior children of inferior or good manual motor ability and gives an historical resumé of tests of motor capacity.

Part II describes the motor tests selected for this investigation from which the most extraneous factors could be eliminated by careful controls, and applies them to certain homogeneous

[1] The writer is especially indebted to Professor H. H. Goddard of Ohio State University, under whose general supervision the experiment was carried on; and to Mr. Harold Edgerton for his counsel and assistance in the statistical treatment of the data; also to Professors W. R. Wilson, S. R. Renshaw, F. N. Maxfield, A. P. Weiss of Ohio State University; and to Professor M. L. Reymert, Wittenberg College, for the use of his tensiometer and for his unfailing helpfulness. The author acknowledges with thanks the help of Mrs. Pearl D. Bowers, and Mr. Herbert Bixby of the Cleveland, Ohio Schools, and Mr. Jacob Bowers, Northwood School, Columbus, Ohio.

age groups of superior children within a definite IQ range, using children of normal intelligence as control groups.

Part III summarizes and discusses the results of the investigation.

Part IV presents the conclusions drawn from the study.

I. A SURVEY OF THE LITERATURE

Terman[2] in 1919 reported four children with IQ's of *145* (167 and 166 on te-tests); *144*, *134* (re-tests, 137, 141); *147* (re-test 156), respectively, making rapid school progress in every subject but handwork.

Chassell[3] cited three cases of children of superior intelligence (IQ's: 140, 158, 149 respectively), having inferior motor achievement.

Garrison, Burke, and Hollingworth[4] investigated the case of E. H., (IQ 187), a most unusual child who entered Columbia University at twelve. E. H. showed constructive ability but no indications of manual dexterity. Follow-up reports confirmed this record.[5]

Gillingham[6] cited four children rated as *166* (re-test, 155); *155* (156 on re-test); *214* (the highest on record); *139* (re-test 140) IQ, respectively, who showed little or no dexterity in manual arts.

Root[7] reported an eight-year-old boy with an IQ of 200 who did excellent work in manual training and was much interested in it.

Case 15 in the same study,[8] a Russian Jew of 15, IQ 124,

[2] The Intelligence of School Children, Ch. 10 and 11.

[3] Three Children of Superior Intelligence and Inferior Motor Achievement. Journal of Applied Psychology, 8: 1924, 127–129.

[4] Psychology of a Prodigious Child. Journal of Applied Psychology, 1: 1917, 101–110.

[5] Subsequent History of E—Five Years After the Initial Report. Journal of Applied Psychology, 6: 1922, 205–210.

[6] Superior Children—Their School Progress. Journal of Educational Psychology, 11: 1920, 327–347.

[7] A Socio-Psychological Study of Fifty-three Supernormal Children. Psychological Monograph, 29: 1921.

[8] Ibid.

possessed artistic and philosophical ability; showed agility and precision on the piano; but was one of the worst penmen irrespective of age.

Kenworthy[9] indicated poor motor ability as a vital contributing factor in maladjustment for one seven-year boy with an IQ of 152, and for another, aged 13, with an IQ of 171.

Stedman[10] also reported a musical prodigy, IQ 147 (re-test 140) as a skillful carpenter. Another girl with an IQ of 140 was described as a child of uniformly superior mentality and of unusual manual dexterity. Another case, IQ 120, did equally well in manual as well as in mental work.

Terman[11] cited a boy with an IQ of 141 who could draw exceptionally well and had mechanical ability.

Root[12] found lack of hand-motor agility especially noticeable in his younger subjects in writing and in the Healy-Fernald Construction Test.

These cases are suggestive but in no case exhaustive. No doubt many other cases could be multiplied from experience and from the psychological literature.

The consensus of opinion relative to superior children with manual difficulties may be attributed to temperamental traits, such as dislike for motor tasks, carelessness, and interest in intellectual rather than in manual activities; inadequate rudimentary training, lack of motor ability, or a combination of several of these factors. More handwork is recommended except in those cases where motor ability is evidently so insufficient that the product would be a waste of time and effort and would induce habits "inimical to a happy school career."

Terman[13] in his survey of practically one thousand gifted children says that "the gifted children do work of superior quality in those subjects which require abstract thought, but they do only slightly better than average in those subjects

[9] Some Emotional Problems Seen in the Superior Child. The Child, the Clinic and the Court, 1925: 22–36.

[10] The Education of Gifted Children, 1924.

[11] Terman, L. M., op. cit.

[12] Root, W. T., Jr., op. cit.

[13] Genetic Studies of Genius, I: 1925.

which depend primarily upon manual dexterity or special talent." The gifted are weakest in the subjects which require manual dexterity. Writing, art, handwork account for 68 per cent of the weaknesses reported for the gifted as against 16 per cent for the control.

In Gillingham's opinion the belief that many high IQ's are poor in muscular control is much exaggerated by the teacher who thinks muscular development correlates with mental age rather than with physical development. Therefore, a child of eight is handicapped if asked to compete with children who are older than he is chronologically but of the same mental level. There are a considerable number of bright children, according to Miss Gillingham, who are deficient in muscular control even for their chronological age. She, as well as Stedman, recommends an unusual amount of handwork for such cases. Chassell would agree if there is sufficient motor ability to justify the training.

Hollingworth thinks that the bright child may prefer reading to manual activities, and hence has not as much practice in motor activities as the relatively unintelligent. Probably with an equal amount of attention the brighter children may surpass their competitors.

A résumé of the uses and results of representative experiments on the tapping test from 1892 until 1927 presents convincing evidence that comparison of investigations is impossible because of difference of purpose, apparatus, and methods of administering and evaluating; differences in the ages and in the range of abilities measured; the variability in the number of cases investigated, and the consequent diversity of results.[14] (The history of the tapping test was selected because it was the one motor test most frequently employed, and inasmuch as it is said to furnish a "better index of motor capacity than any other single test."[15])

[14] The original manuscript of this study, filed at Ohio State University, gives a chronological summary (in tabular form) of 38 typical experiments.

[15] Whipple, G. M. Manual of Mental and Physical Tests, I: 1914, 130.

A detailed summary was made of the various motor aspects measured by different investigators: reaction time, endurance of grip, accuracy, speed, and steadiness of voluntary and involuntary movement, extent of movement, and endurance (fatigue[16]). Other tests are included which should not be classified as strictly motor tests although they contain certain motor elements. They are too complex and the results are influenced by too many extraneous factors to be listed in a well-controlled experiment on motor capacities.

Part II gives the data relative to the selection, number, age, sex, and IQ range of both the experimental and control groups. There is, in addition, a description of some simple motor tests (insofar as that is possible), a description of the apparatus, the experimental procedure, and the method of evaluating results for both groups.

II. TEST PROCEDURE

Definition of the term superior

A resumé of the literature reveals a shifting point of view and the absence of a definite standard of superiority. Since Whipple's pioneer study in 1918[17] children of unusual ability have been called "gifted" whose IQ's varied anywhere from 140 and above to as low as 115. In other words, they include roughly any within the upper one per cent to the upper ten per cent of the children of any age. This investigation will use the word "superior" or "bright" to designate those children falling within the upper ten per cent, and will restrict the word "gifted" to the top one-half of one per cent of the children of any age.[18] This classfiication based largely on verbal intelligence may be valuable in the future if Terman's investigation has much weight, and if we continue to fill our special classes with the relatively superior instead of the exceptionally gifted.

[16] Tabular summary of 50 investigations presented in original investigation.

[17] Whipple, G. M. Classes for Gifted Children.

[18] Terman, L. M. Genetic Studies of Genius, I.

Experiment I

Subjects. The first experiment was made during November and December 1926 on 95 children eight to twelve years of age, selected from "High IQ" classes of four representative Cleveland schools. The basis of selection, with few exceptions, was a Stanford-Binet IQ of 115 or above. These groups will be referred to hereafter as the "E" Groups. The children in these groups were matched with 97 children of approximately the same age and sex, where possible, judged by teachers and by principals to be of normal ability. These groups will be referred to hereafter as the "C" Groups. Both sexes were represented. However, there were more boys than girls. The children ranged in grade from 3B through 6A. The majority of the children came from skilled and semi-professional and business groups. It is rather difficult to obtain reliable information on the nationality of the children. Many of the American children in Cleveland come from distinctly foreign home environments.

The procedure. There follows a description of each test, the apparatus used, the directions given, the time occupied, and the method of recording.

1. The tensiometer. This apparatus was devised by Dr. M. L. Reymert of Wittenberg College to determine (with vision eliminated) the delicacy of various degrees of muscular tension and the perception of the extent of movement.

Apparatus.[19] The box of the tensiometer is 18½ inches long, 2½ inches wide, and 1¾ inches deep; inside measurements, made of ½ inch material. A slot about ¼ inch wide by about a foot long is cut in the cover of the box for a pointer to move through. A rod with a handle on one end is inserted through the end of the box and a spring and pointer attached. One end of the spring is attached to the pointer and the other end to the end of the box toward the handle so that the spring will be extended when the handle is pushed in. A block of wood covered with felt is fitted into the box and fastened to the end of the rod as a guide.

[19] Description written by Dr. Reymert.

The felt acts as a silencer. A scale numbered with 0 in the middle, and increasing toward both ends (in millimeters) is fastened to the cover under the pointer. A stopper is fixed at the 0 point so that it may be set or removed at will.

Goggles lined with thin white paper are used to blindfold the child.

Preliminaries. Subject (hereafter referred to as S) is permitted to look over the apparatus and is shown how the stopper works. The apparatus is adjusted to sitting height of the child so that the arm will be at right angles to the handle. The stopper is locked and S is told:

"I want to see how accurate you are in finding the same place every time you push this handle in. The place is marked zero (indicates place). When we are ready I shall put these glasses on you so you cannot see. It doesn't make any difference to me what score you make, but do your best.

Directions. "Listen carefully while I tell you what to do: Push the handle in slowly (illustrates) until it stops, and hold it there without moving it until you think you know how it feels. When I say 'back,' bring the handle towards you slowly like this." (Illustrates and adjusts glasses to S.)

S is told to "Go ahead" and Examiner (hereafter referred to as E) counts three (a little faster than one per second) while S is at zero. 'Back.' "Do this four more times exactly as you did it this time." At the end of the fifth trial the stopper is released, and E says:

"From now on I shall not stop you. You must try to make the handle stop every time at the same place (zero). When you think you have reached zero, stop long enough for me to record the score. Pull back when I say 'all right.' " Give ten trials with the right hand only unless S is left handed.

Treatment of results. The M.V. of ten trials constituted the score. Time for each trial in seconds was recorded for three schools.

2. The tapping test. The purpose of this test was to determine the maximal rate of voluntary movement in a continuous motor performance.

Apparatus. Telegraph key wired in circuit with a Veeder counter. Stop watch used for recording time.

Preliminaries. S sits with elbow at right angles to the key with full forearm movement (not resting on table) and free from the body. Preliminary trials given on each hand. Five trials of five seconds each are given with each hand alternating.[20]

Directions. "I want to see how fast you can tap on this key. Hold your arm this way (illustrates), and tap the key like this. (Use the forefinger.) Now you try it." Allow S to tap for a few seconds. Correct his position if it is wrong.

"Now hold your hand ready and when I say 'go' tap just as fast as you can until I tell you to stop." S is stopped at the end of five seconds. Rest one minute after preliminary trial and approximately 20 to 25 seconds between each of the other trials.

Treatment of results. The average number of taps for all five trials constituted the score for each hand.

3. Steadiness test. This test was used to measure the amount of involuntary movement which appears when the finger, arm, or body as a whole is held at rest.[21]

Apparatus. The apparatus consists of a steel plate set in a frame at an angle of 45 degrees. It contains nine round holes arranged in two rows, four in the upper row and five in the lower. The holes decrease in size from the left-hand one in the top row (one-half of an inch in diameter), to the right-hand one in the lower row ($\frac{7}{64}$ of an inch in diameter). The apparatus is wired in circuit with the telegraph sounder, and also with a flexible wise to which a metallic pencil is attached.[22]

Preliminaries. S is placed with elbows at right angles to the hole tested. When the pencil is in the hole the elbow is as far forward as the front surface of the body. Arm is held

[20] Only two trials for each hand alternating were used at one Cleveland School.

[21] Whipple, G. M. Manual of Mental and Physical Tests, I: 1914, 157.

[22] Woolley, H. T., and Fischer, C. R. Mental and Physical Measurements of Working Children. Psychological Monographs, 18: 1914.

free from the body. The board upon which the apparatus is attached is flush with the edge of the table.

Directions. "This is to find out how steady you are. When I put this metal pencil into one of these holes, and hold it still (E illustrates), nothing happens, but as soon as my hand moves a little and makes the pointer touch the side of the hole, it causes that click (E illustrates). I want you to put the pencil straight into the middle of this hole (pointing to the fourth one, the smallest in the top row), and see how still you can hold it . . . . how few clicks you can make. Now try it and let me see if you can hold the pencil properly (corrects any error). Now that is right. I will tell you when to put the pencil in, and when to take it out. Don't mind the first few clicks. They do not count against you anyway."[23,24]

If S makes 12 clicks or more try the next larger hole; try a smaller hole for 4–12 clicks, and skip to the second smaller hole for three or less clicks. If S holds his breath, tell him not to do it next time but to work naturally. Eighteen seconds are given but the first three seconds are not counted against his score.

Treatment of results. Record the smallest hole reached and the number of contacts made in that hole for each hand.

4. The tracing test. This test is often used to test steadiness rather than accuracy of movement. However, Whipple[25] points out that it differs from the typical steadiness test in that it measures control of voluntary movement.

Apparatus. For an accurate description and illustration of the tracing board consult Whipple[26] and Wellman.[27]

The instrument consists of a wooden block upon which there is a glass path 25 cm. long. Rulers 5 mm. wide at the top and

[23] Ibid., 63–64.

[24] Dewey, Child, Ruml. Methods and Results of Testing School Children, 1920: 60–64.

[25] Whipple, G. M., Manual (op. cit.), 154.

[26] Whipple, G. M., op. cit., 151–155.

[27] The Development of Motor Coördination in Young Children. University of Iowa Studies in Child Welfare, 3: No. 4: 1926.

one mm. wide at the bottom with brass strips are raised on either side of the glass in an oblique position. A metallic pencil is wired in circuit with a telegraph sounder which clicks when a contact is made with the brass strip.

Preliminaries. Seat S comfortably with the tracing board squarely before him so that the movement is directly toward the body in the median plane.

Directions. "When I say 'ready' I want to see how nicely you can draw a line on the glass between these strips of metal without touching either one, like this." (E shows S.) (The movement should be continuous from start to finish, arm entirely free without supporting the hand or arm in any way.) Allow S two or three preliminary trials until he secures the 9-second rate approximately. The stylus is to be held in a slanting position. Help S place tip at the beginning of the strip.

As soon as a click of the sounder indicates a contact, stop S and begin with the other hand. Repeat for five trials with each hand alternating. Record the point on the scale at which the contact is made.

Turn the apparatus around 180 degrees and test movement away from the body in the same manner.

Treatment of results. The score was the average for five trials on each hand in both directions.

5. Strength of grip. This test was given to determine the maximal amount of strength in both hands through a series of separate contractions.

Apparatus. The Smedley Dynamometer used in this test is illustrated in the Manual.[28]

Preliminaries. E shows instrument to S and says: "This machine is to measure how strong your hand is. It works this way. I take it in my hand and squeeze it just as hard as I can (illustrates). E shows S record and says (pointing to the score) this shows you how hard I squeezed. Now hold out your hand and let me see if it fits you properly." (Adjusts until comfortable.)[29]

[28] Whipple, G. M., op. cit., 116.

[29] Woolley and Fischer, op. cit., 52.

Adjust the dynamometer so the lower edge of the upper grip lies along the base of the middle fingers and the lower edge of the lower grip lies against the heel of the hand.

Directions. "Now you take it, and hold it down at your side. (E shows S.) You can get a better grip if you bend down a little like this but do not touch the body or floor. Now squeeze just as hard as you possibly can." Give three trials with each hand alternating right and left. Keep urging S to do his best. (Present the dynamometer to the child face outward.)[30]

Treatment of results. The score is recorded in kilograms. The best of three trials was taken as the record for each hand.

6. Rating of manual abilities. Each teacher was handed a sheet with the following directions:

Please rate the children participating in this experiment in manual ability.

Definition. Manual dexterity or manual ability means the child's general aptitude in the management of things with the hand.

Please note that we differentiate between constructive ability (having ideas of how to construct a mechanism or how to perform a mechanical operation clearly) and manual dexterity (the ability to execute ideas with the hands). *We are interested chiefly in manual dexterity.*

How to rate. Consider such subjects as: sewing, manual training, drawing, typewriting, and any other work requiring general aptness in using fingers, hands and arms. Rate as follows:

1 Denotes superior	manual dexterity
2 Denotes good	manual dexterity
3 Denotes average	manual dexterity
4 Denotes inferior	manual dexterity
5 Denotes very inferior	manual dexterity

7. Record card. A card was designed to record information concerning the child's name, address, school, class and grade,

[30] Dewey, Child, Ruml., op. cit., 63.

nationality, date of birth, IQ, date of IQ, room, group, remarks. In addition it served as a uniform record blank for all the scores made on every test for each child.

Experiment II

The data of experiment I were used for the second experiment. The criterion of selection, however, was different. The children were selected according to their rating on the National Intelligence Test (group test) IQ. Those children having IQ's between 90 and 119 were selected arbitrarily for Group C, and those with IQ's ranging from 120 to 184 were used for Group E. There were no records on N. I. T. IQ's for 23 cases which were eliminated. The same tests and procedure used in experiment I were used in experiment II.

Experiment III

Tests and procedure identical with the Cleveland experiments were used at N—— School in Columbus, Ohio, during January and February, 1927. The personnel of both groups, however, was restricted to 28 children ranking 115 IQ and above on the Stanford-Binet for Group E, matched with 28 children of approximately the same age with IQ's ranging between 90 and 110 for Group C. The majority of the children were nine-year olds. There were more boys than girls. The children were Americans and came from average homes. They ranged from grades 3B to 6A. Two children were in the Individual Room and were unclassified.

Experiment IV

Relatively little experimental work has been done upon the effect of practice on a motor function.

The writer selected the children described in experiment III to participate in an experiment to determine the effects of daily practice on the results of the tapping test.

The first records were obtained in January, 1927, at the same time that the entire test series (discussed in experiment III) were given at N—— School in Columbus, Ohio.

The children were tested every afternoon during the period extending from February 2nd through February 24th, Saturdays, Sundays, and Washington's birthday excluded.

The children were urged to excel and were allowed to keep their daily records if they wished. Including the initial test each child in the E Groups had 17 practice periods of five trials each for both hands, unless absent. The C Groups were given an initial attempt consisting of five trials for both hands, and a final trial at the end of the experiment. On the whole the children coöperated well with the exception of three rather unstable children.

III. SUMMARY AND DISCUSSION OF RESULTS

A summary of results for all schools, and the scores for ages 9, 10, 11 included in experiments I, II, III, show that with very few exceptions the differences are negligible between the experimental and control groups.[31] In most instances, the relatively few cases in certain year groups, the unequal numbers in some of the age distributions, and a few extreme individual scores account for the discrepancies between the groups in the tensiometer and tracing tests. (The standard error of the difference of the means was used.)

The intercorrelation tables[32] based on experiments II and III show exceedingly low positive and negative relationships between the motor tests and intelligence for both groups. This seems to indicate that motor abilities (as measured by the tests presented) are relatively independent of intelligence as judged by teachers and principals, Stanford-Binet Scale, and the National Intelligence Test. The low positive and the negative intercorrelations between the different motor tests using the formula:

$$r = \frac{n \cdot \Sigma xy - \Sigma x \cdot \Sigma y}{\sqrt{n \cdot \Sigma x^2 - (\Sigma x)^2} - \sqrt{n \cdot \Sigma y^2 - (\Sigma y)^2}}$$

[31] Original manuscript presents a tabular summary of the Means, Medians, Standard Deviations for the E and C Groups on all tests.

[32] Filed in original manuscript.

indicate there is no general motor capacity. The largest coefficients are those between the left and right hand performances of the same test. We should speak, therefore, of *motor capacities* rather than *motor capacity*, as these motor capacities seem to be independent of one another.

In correspondence with L. Dewey Anderson, who conducted an elaborate investigation in mechanical ability (now published[33]) the statement is made that "in most cases low correlations were found between most of the standard motor tests and the intelligence as measured by verbal intelligence tests."

Results of the Tensiometer Test experiments of Dr. Reymert of Wittenberg College are not available for comparison. Performance on this test showed much variability.

The tapping test apparatus is too fragile for constant use unless frequently repaired. The scores of several superior boys were eliminated because habits involved in using the Morse Code interfered with test technique.

The tracing test presented the greatest difficulties. The necessity of having light portable apparatus made it impossible to use any kymograph attachments. Consequently, there were no permanent records of the actual tracing movements. It is difficult to record the exact score if the child lifts the stylus immediately as the contact occurs. The scores for the children in experiment III may have been increased on account of the paths worn in the glass. In some cases it proved a hindrance.

Bolton,[34] Thompson,[35] and Whipple[36] claim that movements inward are steadier than movements away from the body. Wellman[37] found no significant differences. The present investigation shows contradictory results.

The Steadiness test required extremely close attention in

[33] The Relationships of Certain Environmental Factors to Measures of Mechanical Ability. Twenty-Seventh Yearbook of the National Society for the Study of Education, Part II: 1928, Ch. 10.

[34] The Relation of Motor Power to Intelligence. American Journal of Psychology, 14: 1903, 615–631.

[35] The Mental Traits of Sex, 1903: Ch. 2.

[36] Whipple, G. M., op. cit., 155.

[37] Wellman, B., op. cit.

counting the contacts. The investigator noticed many excess movements and grimaces during the performance, similar to those observed by Johnson.[38] The most common reaction was the protrusion of the tongue.

The postures and grimaces on the Dynamometer test are quite similar to those which Binet and Vaschide discuss.[39]

The teachers' ratings of the children in manual dexterity show no significant difference between the groups. Two ratings made by each teacher at different times would have increased their reliability.

The results of experiment IV indicate that practice effects on the tapping test are negligible for both groups.[40] The decrease in score may be due to loss of novelty as the tests are continued.

In evaluating the results of this investigation Perrin's statement[41] is particularly significant: "Even the simplest act of motor adjustment involves a play of factors not isolated through standard experimental precautions." It is also well to remember that in experimental work we cannot get the beginning or the end of a practice curve.

IV. CONCLUSIONS

In answer to the questions raised in the problem it can be said:

1. The differences in performance on manual motor tests of superior and average children are negligible, and,

2. While our data may be too limited to be conclusive, they show that the difference in practice effects on a motor function between the two groups is insignificant. Tasks involving motor ability might well be added to the course of study for superior children providing local conditions warrant it.

Note: An annotated bibliography of 110 references was included in the original dissertation.

---

[38] Experimental Study of Motor Abilities of Children in the Primary Grades. The Johns Hopkins University Studies in Education, 2: 1917.

[39] Experiences de Force musculaire et de Fond Chez les jeunes Garcons. L'Annee Psychologique, 4: 1897, 15–63.

[40] Given in original manuscript.

[41] An Experimental Study of Motor Ability. Journal of Experimental Psychology, 4: 1921, 24–56.

ERRORS IN SELF JUDGMENT

T. A. JACKSON

Columbia University

In an examination of the literature on "judgment" it occurred to the writer that there might be a significant relation between intelligence and the "ability to judge oneself." The following computations were made in the search for the answer to that question and others which naturally arose in connection with it.

The data used were gathered by Professor Hollingworth and Misses Conklin and Cogan.[1] A more detailed description of the subjects and how the data were gathered may be had in the original study. It will be enough here to say that twenty-five subjects ranked one another in each of eight character traits, namely, refinement, intelligence, neatness, beauty, sociability, humor, snobbishness and conceit. The ranking was done for each trait at a different time, with at least an interval of two weeks in order that the rankings would be as little confused as possible.

In the original study all inter-correlations were computed. Also each trait was correlated with self estimate and with ability to judge others. Further, each trait was correlated with a battery of tests, which was used as an objective measure of intelligence.

In the report that follows there will be frequent reference to intelligence "by test," and intelligence "consensus." The former is, of course, intelligence as measured by the battery of tests. The latter is the same trait as measured by the sum of the rankings of the twenty-five subjects. For example, an individual's score in intelligence "consensus" who was

[1] Hollingworth, Conklin and Cogan, "An Experimental Study of Self-Analysis, Estimates of Associates, and the Results of Tests," School and Society, Vol. II, No. 31, (1915), p. 171–179.

ranked number one by all the subjects including herself would be twenty-five; similarly one who was ranked twenty-five by every subject would get a score of 625. Obviously then the scores could range from 25 to 625, but actually they ranged from 119 to 543.

"Ability to judge oneself" was measured by the sum of the eight "differences" or "displacements" between consensus ranking and a subject's ranking of herself. For example, subject number five ranked herself eleventh in intelligence; the consensus rank for her in intelligence was seventh. Then four, (11–7), is her "difference" or "displacement" in intelligence. The sum of her "displacements" would be her score in "ability to judge oneself." In this measure no attention was paid as to whether the displacement was up or down the scale. The assumption upon which this measure is based obviously is that the individual who ranks herself most like the consensus is the best judge of herself. The scores in this measure could possibly range from 0 to 312, however the actual range is from 18 to 97.

First, the correlation between intelligence and "ability to judge oneself" was computed. Both measures of intelligence were correlated. The Pearson product-moment formula was used in the computation of all the correlations in this study.

Next a comparison was made between the five most intelligent subjects and the five least intelligent in their average "displacement" for the eight traits. This procedure seeks also to find whether the more intelligent are better judges of themselves. After those averages were computed the averages for the desirable traits were compared with the averages for the undesirable traits. All these averages will be found in Table I of Results.

In the above no attention was paid as to whether the displacement was up or down the scale. The next step logically is then to find the constant error of displacement. In other words is the distribution of displacements the same for the five most intelligent as it is for the five least intelligent?

For which trait is the average displacement greatest? For

which is it least? Is it greater for the desirable or the undesirable traits? Answers to these questions were also found.

Lastly "conceit" as measured by consensus was correlated with "ability to judge oneself."

RESULTS

1. The correlation between intelligence (consensus) and "ability to judge oneself" was found to be +.70; between intelligence (by test) and "ability to judge oneself" +.48.

2. The average displacement of the five most intelligent compared with the five least intelligent, in (*a*) all traits, (*b*) desirable traits, (*c*) undesirable traits. (See table 1.)

The relation between intelligence and "ability to judge oneself" as shown in this table is quite consistent with the correla-

TABLE 1

	ALL TRAITS		DESIRABLE TRAITS		UNDESIRABLE TRAITS	
	Con.	Test	Con.	Test	Con.	Test
5 most intelligent.....	3.8	5.1	3.5	4.9	5.0	5.6
5 least intelligent.....	9.8	7.8	11.3	9.4	5.2	3.2

tions of (1). For when we note the results for "All Traits" we see that there is a positive relation between the two traits and that the relation is closer when intelligence is measured by consensus. The relation is still closer for desirable traits, however we do not have a correlation to match it. In the case of the undesirable traits the two groups are about equal in ability to estimate their traits. If there is any difference it seems to be in favor of the less intelligent group. At least we can be certain that the five least intelligent displace themselves decidedly less in the undesirable traits than they do in the desirable traits. This tendency, it seems to the writer, might be accounted for in this way. People are more critical of undesirable traits than of desirable traits. Undesirable traits are discussed more, and because of this the subject may become aware of her stand-

ing in that trait, and thus enable her to judge herself better for those traits.

3. The constant error of displacement of the five most intelligent and five least intelligent compared, for both the desirable and the undesirable traits. In order to facilitate interpretation of these averages it seems necessary to state the results as amounts of "favoring of self." Thus plus numbers mean favoring self, and minus numbers mean disfavoring self. (See table 2.)

It will be observed that the most intelligent favor self less than do the least intelligent. Referring to the "Con." (consensus) column of desirable traits, the plus and minus displacements almost balance for the five most intelligent; but the five least intelligent with a constant error of +11.3 show a decided

TABLE 2

	DESIRABLE TRAITS		UNDESIRABLE TRAITS	
	Con.	Test	Con.	Test
5 most intelligent	−0.3	+2.0	−3.0	−5.0
5 least intelligent	+11.3	+8.9	+5.2	+3.0

tendency to favor self. In fact every single displacement of the latter group, in that particular case, was a plus displacement, that is, each of the five least intelligent subjects favored self in each of the six desirable traits. Since all these displacements in just this one case were in the same direction, (were all plus) the average with signs considered is the same as it is when they are not considered. Thus it may be noted that +11.3 under "desirable traits," "Con.," will be found in both table 1 and table 2. Then considering the undesirable traits we see a different relationship. The more intelligent group disfavors self almost as much as the less intelligent one favors self.

Just why the five most intelligent do not favor self as much as the other group is partly because they can not, and in so far as that is the case the results are not meaningful. To illustrate what I mean, for example if one of the subjects is ranked num-

ber one by her associates (consensus) she could not favor herself; she could either agree with them or disfavor herself by ranking herself fifth for example. That may help to account for some of the disfavoring of self. However this statistical illusion tends to vitiate the results to only a small degree, at least so it seems to the writer.

4. Average "displacement" in each trait. Also the "displacement" for the desirable traits is compared with that of the undesirable. (See table 3.)

5. The correlation between conceit and "ability to judge oneself" was found to be −.62. The more conceited the individual the poorer she is as a judge of herself.

TABLE 3

DESIRABLE TRAITS		UNDESIRABLE TRAITS	
Humor	8.1	Snobbishness	5.4
Neatness	7.5	Conceit	5.0
Intelligence	7.4		
Beauty	6.4		
Refinement	6.0		
Sociability	4.2		
Average	6.6	Average	5.2

CONCLUSIONS

It seems that the following conclusions might justifiably be drawn.

1. That there is a significant positive correlation between intelligence and "ability to judge oneself."

2. That the five most intelligent subjects displace themselves decidedly less than do the five least intelligent when all eight traits are considered.

3. That the five most intelligent displace themselves slightly more in the undesirable traits than in the desirable traits.

4. That the five least intelligent displace themselves decidedly less in the undesirable traits than in the desirable ones; their displacement is even slightly less for the undesirable

traits than the displacement of the five most intelligent is for the same traits.

5. That the five least intelligent "favor self" more in both desirable and undesirable traits than do the five most intelligent.

6. That the five least intelligent "favor self" more in desirable than in the undesirable traits.

7. That the five most intelligent judge themselves pretty well in the desirable traits but that they "disfavor self" in the undesirable traits.

8. That there is the greatest displacement for "humor" and least for "sociability."

9. That there is slightly more displacement for the desirable than for the undesirable traits.

10. That there is a significant negative correlation between amount of conceit and ability to judge self.

The outcome of this study might be summed up as follows: that more intelligent subjects make better judgments of themselves than less intelligent subjects, and that less intelligent subjects judge their undesirable traits better than their desirable ones, whereas the opposite holds at least to a slight degree for more intelligent subjects. Subjects with a greater amount of conceit do not judge themselves as well as subjects less conceited.

HOW A SPECIAL DISABILITY IN SPELLING WAS DIAGNOSED AND CORRECTED

WILLIAM F. BOOK

Indiana University

This paper attempts to describe how an unusually bright boy twelve years old learned to overcome a special disability in spelling which was so great that no one could read what he attempted to write.

His inability to spell was chiefly due to the fact that he had not learned how to talk. His oral speech was in fact so defective that even his mother could not understand what he said. Because he was unusually bright[1] and very eager to learn he had been promoted to the sixth grade in school. But he had great difficulty with his work because he could not make himself understood by means of oral speech and could not write because he could not spell well enough for his teacher to read what he wrote. He had, however, learned to read and could correctly interpret all that was said to him and was succeeding with all his studies but writing and spelling. He had learned to associate the correct meaning with each word he saw printed, written, or when he heard it spoken. But he had not learned to perceive the spoken words correctly through his auditory sense and so could not spell because he was trying to spell his words by sound.

I. THE BOY'S ABILITY TO SPELL WHEN OUR EXPERIMENT BEGAN

Careful tests made of his spelling achievement before our experiments began revealed the following facts. Out of a list of 50 words selected at random from the words taught in his school to the third and fourth grades he wrote 30 per cent of

[1] He made an IQ of 120 on the Stanford Intelligence Test.

them correctly when they were pronounced to him. Out of a similar list of 50 words selected from the words taught in the fifth grade he wrote 20 per cent correctly. From a similar list of sixth grade words he wrote only 15 per cent correctly. He, however, knew the meaning of practically all of these words. This was determined by having him define in writing each one of the words in these several lists after he had attempted to write them.

The words whose spelling he had standardized he always marked correct if asked to check the words he thought he had spelled correctly. But he also thought that the words incorrectly written were spelled correctly. Only in a few cases did he know that he had written these words incorrectly. When asked how he knew that a word had been correctly spelled he said that "they looked right to him." But so many other words looked right to him that it is safe to conclude that he had never been taught in his spelling course to compare the appearance of his own written words with the correctly written or printed words in his copy.

A number of tests were next made to ascertain whether the boy could really observe a word correctly when seen in print. In one of these tests he was asked to spell a list of 120 words pronounced to him as in the ordinary spelling exercise. Most of these words were taken from the list of words taught in the third grade in his school. He could, however, write only 35 per cent of these words correctly. The critical test was then made by giving him a typewritten list of these 120 words and asking him to copy each word to the right of the correctly typed word. He missed only one word out of the entire list and this mistake was clearly due to careless observation of the word. This and other tests revealed that the boy could observe and copy any word correctly that we placed before him, for when asked to copy the words he failed to spell correctly on any spelling test, he always copied them correctly. It was also observed that after he copied a list of words in this way that he could spell a number of them correctly when they were needed in his other work.

II. SPECIAL DISABILITY SHOWN BY THIS PARTICULAR LEARNER

To get some idea of the unusual difficulty which this type of learning presented to this handicapped boy we need only give a few illustrations from his attempted spellings of the simplest words which he could readily recognize when seen in print, when they were correctly written, and when they were spoken in his

TABLE 1

Sample spellings when words were pronounced and written on his own initiative in defining a word

WORDS PRONOUNCED	LLOYD'S SPELLING OF WORDS	WORDS PRONOUNCED	LLOYD'S SPELLING OF WORDS
worry	wonthey	hospital	hospilit
chisel	chiler	parade	proad
chores	joer	serene	clerm
exact	axsated	cough	coffet
example	axpemel	conqueror	qourtner
item	itrond	quality	quartey
supplies	suprice	calico	cowago
consist	concite	junk	jumte
limited	limed	blew	bsue

WORDS PRONOUNCED	LLOYD'S SPELLING OF WORDS	SAMPLE DEFINITIONS
gallon	gomen	4 qt.
noisy	bussing	a bast sound
chorus	corstis	a fets of a song
quarter	quartey	quartey of a fing
torrid	torrost	hot or torrost zone
vice	vistes	a thing to hold something
social	souled	is a picnich
conscious	conest	then your un (are) conest

presence. The following samples are typical of his spelling mistakes, and when scattered indiscriminately among the few words which he had learned to spell, it will be seen why it was practically impossible to read what he attempted to write.

It was noticed in studying his efforts and misspellings that he had most trouble with the words he could not pronounce and with the parts of the words which contained the letters

"s," "r," "l," "t," "th," "d," and "h," and various combinations of these and other letters which he could not pronounce at all.

In one list of words he could not write "door." A little later the experimenter pronounced the word "Dan." That seemed to give him his verbal cue for starting the spelling response for the word "door," for he went back and wrote this word correctly in its proper place in the column. Later, as his speech difficulties were being slowly corrected[2] so that he could pronounce some of the letters that were most difficult to pronounce, he seemed to be helped in his spelling by this improvement in oral speech.

It was also noticed that when these difficult letters and sounds came at the beginning of a word, his spelling difficulties were greatly increased and that a difficult letter coming later in a word regularly caused a disturbance with the writing of the first part of the word. In these instances the learner seemed to be anticipating these difficult letters which made it impossible for him to do what he otherwise could have done quite easily.

These observations call attention to the importance of starting the spelling process with the pronunciation of the word. The sound of the word suggests its meaning to which the motor habits involved in writing the word should be attached. Something must call up or initiate these writing responses or the corresponding oral spelling of the word. These spelling responses are usually set off by the pronunciation or thought of the word. They can, however, be aroused and properly directed in writing the word by a clear visual image of the word as had to be done by our subject. At a much later stage in the learning when the spelling habits have been firmly established, all that is needed to initiate and control these writing responses is the thought to be expressed as the mere desire to

[2] The experiments on spelling were not begun until considerable improvement had been made in learning to talk. A report on the latter case of learning will be presented by the writer as another study in learning.

express a certain thought. This calls up both the appropriate words and the series of movements required to write them. In the beginning stages of the learning, however, something must initiate the correct responses. This is in most cases the correct pronunciation of the word to which the spelling responses must become indelibly attached. This is probably the reason that learning to pronounce the words aided our subject in learning to write them correctly.

III. METHOD OF STUDY USED BY OUR SUBJECT BEFORE THE EXPERIMENTS BEGAN

So far as the writer could ascertain from the boy's method of studying the words and from questioning his mother, who had always tried to help the boy, he was never specifically shown by anyone just what he had to do to learn to spell the words he desired to use or the words that were pronounced to him in the spelling exercises. That he should have learned to associate the proper meaning of the words with the printed symbol when the words were seen in print or when he heard them pronounced is a remarkable achievement for him, because he was unable to hear these words in the way they are pronounced. The only way he could use these words correctly was to attach the meaning of the words to his own peculiar way of pronouncing them and to the printed and written symbols for the words. This type of association was made for all the words he knew. Stranger still, and probably as a sheer matter of economy on his part, he had learned to perceive the words *pronounced to him* as he himself pronounced them. That this was regularly done by this boy was determined and verified by actual tests.

What this boy had, however, failed to learn was (1) to link the correct spelling response (writing the words, for he could pronounce the letters) to the sound of the word. This he had to learn to do in order to write the words correctly when they were pronounced to him. (2) He had also failed to link the correct spelling response to the meaning of the word because he was just as unable to write the word correctly when he desired to use it himself as when the word was pronounced to him in a spelling exercise.

What this boy was therefore trying to do was to spell words by sound which he could not hear or perceive correctly and which he could not himself pronounce. This fact will give the reader some idea of the difficulty he was encountering in learning to spell and the cause of his inability to learn this particular school subject.

His teachers and mother had not shown him what he had to do to learn to write the words correctly because they did not fully appreciate his handicap and so could not show him what he had to do to overcome it. The boy could not discover it for himself because he was not aware of his real difficulty and did not know what he had to do to succeed with this particular learning task. In this situation he had really standardized the most perplexing form of spelling that could well be imagined and had carried the practice so far that many of the grotesque spellings which he invented and used had become standardized and actually "looked right" to the boy when he wrote them.[3]

Great care was, therefore, taken in our experimental work with this boy to determine (1) everything which he did while studying a spelling lesson or when he tried to learn to spell a list of words. In answer to questions on this point he said that he "wrote the words ten times and tried to remember the syllables, like *dis tance*." When asked (2) what helped him most in learning to spell the words he needed to write, he said "I write them ten times; I try to learn the syllables; hearing the teacher use the word in a sentence." (3) When asked to state in writing what caused him most trouble in spelling the words he had to write, he said that "words that looked alike caused him most trouble"; e.g., *cell* and *celt*, because "I get them mixed." He also said that words that had no syllables caused him much trouble because he could not learn them right. (4) When asked what his teachers had done to try to help him in learning to spell, he said: "They had me write the words. To sound them. To study at home where my mother could

[3] The pronunciation of all these words had become wrongly standardized so that one needed to learn virtually a new language to be able to understand him.

help me. I have to learn ten words a day and then go back over them in a month."

By carefully prepared tests and questions it was determined that this boy had never been shown how to study his words correctly. He had never been given any suggestions in regard to how to visualize a word after it had been correctly observed though this in his predicament was the best or only method he could use to learn to spell until his speech defect was corrected. What this boy was really trying to do was, therefore, to initiate the letter-making movements required to write the words by pronouncing the letters and words before or while he wrote them. Because he did not hear the words correctly and had standardized an entirely wrong pronunciation for the words and letters which composed them, he experienced an insurmountable difficulty in learning to spell by the method which he tried to use.

This disability was in part overcome by copying the words correctly and testing the accuracy of his spelling response by comparing his written words with the copy. This he had learned to do in part, and it had netted him a certain achievement in spelling that amounted to from 15 to 30 per cent of the words he needed to use. The best method for learning the words was, however, never suggested to him. In fact, carefully checked tests showed that our subject could not get a visual image of any word presented to him even after he had observed it for a minute. That he was observing these words correctly was proven by the fact that he could always copy them correctly whenever he was asked to do so. That he was using a motor spelling to guide his writing throughout was shown by the fact that he always moved his lips and tried to pronounce the letters while attempting to write the words.

IV. METHOD USED BY THE WRITER IN TEACHING LLOYD TO SPELL

Since our tests revealed that this boy had already learned how to observe the words correctly, special emphasis was placed on showing him what he had to do to learn to write the words correctly. He was, therefore, shown just how he had to pro-

ceed to write each word correctly *after* it had been correctly imaged and its exact letter and syllable sequence carefully observed and learned. He was first shown how to get a visual image or picture of the word to be learned. He was then shown how he could test for himself whether he had seen the word correctly or not and whether or not he knew it well enough to write it from his mental picture of the word.

To illustrate this method of studying the words he was given a number of words one at a time and asked to observe each word carefully. He was then asked to get a picture of the word so that he could see it when his eyes were closed. One explanation of just what he should do was all that was necessary to get him to observe the words correctly and to visualize them. He was directed to observe his picture of the word carefully and always to test the accuracy of his image by comparing it with the model to see that his picture was both accurate and distinct, and was told to repeat this procedure with each word until his picture of the word was so clear that he could write the word from the picture.

Some care was needed to eliminate the old time vocalization when the word was being written, but this was soon conquered because he could visualize and write the words so easily and rapidly. For these tests, very difficult words were selected, such as "syllable," "parent," "wrought,"—words that had letter combinations in them that he could not pronounce. These words were learned in an incredibly short time and could easily be written from visual memory five minutes after they had been observed and visualized only a few times.

After this supervised study of a dozen or more words the next step in directing this learner was taken: namely, to give him a typewritten list of directions embodying each step in this procedure and asking him to read these over carefully to see if he understood them. When he assured the experimenter that he could use this list of directions to guide him in his study of the words, he was given a list of ten words to study in the laboratory according to the directions given under "How to Learn to Spell Each Word" in the following set of directions

for learning how to study the words. He studied this list of words in this way until he felt that he could write each word correctly. He learned the list in four minutes and could still write all of the words correctly five minutes after he had written them the first time. All the words in the list were words he could not spell.

The experimenter then explained to him that he would have to review these words many times before they were *permanently* learned and asked him to make sure that he always wrote his words from his picture of the word. He was also told that he must always make sure that his picture of the word was correct before he tried to write the word and that it was absolutely necessary to compare his written word with the model in his copy each time he wrote the word and that he must continue this process until the word was completely learned.

He was then given the list of directions printed below and asked to read them over each day before he began the study of his list of new words, so that he would know just what he had to do while studying the words. The method was also carefully explained to his mother so that she would be able to help him and check up on the accuracy of his method of studying the words. He was given a list of 20 words to learn each day and arrangements were made for reviews distributed in such a way that the correct spelling habits might be permanently established. No special provisions were made to *eliminate the wrong spelling habits* which the boy had standardized save to take *extra precautions* to see that the *correct spelling habits* for the words were always practiced. The study and review practices were continued two weeks with the results shown in Section V.

Directions given to the learner for studying the words[4]

I. How to learn to spell each word:

1. Study and learn one word at a time.
2. Look carefully at the word and think what it means.

[4] These directions are printed just as they were given to our learner. For purposes of instruction or use by teachers, they could be shortened and improved.

3. Have it pronounced by examiner or mother.
4. Then note very carefully all the letters that make it up and the exact order in which they come.
5. Next look for any known or familiar parts of the word and for the syllables that make up the word, such as *pre-pare, suc-ceed, do-main.*
6. Observe the word, in this way, carefully two or three times. Then close your eyes and try to see it with your eyes closed. If it is not clear so that you can mentally see all its syllables and letters open your eyes and look again. Study it carefully in this way noticing each time you look at the word the various letters that compose it.
7. When you get so you can see the word plainly with your eyes closed, write it just as you pictured it in your mind, *but without pronouncing any of the letters.* Just write it. If you are uncertain about how it is spelled, look at your copy again, then close your eyes to see how it actually looks and write it without looking at the copy.
8. After writing the word, compare it with your copy to make sure that the word you have written is exactly like your copy and like the picture of the word which you had in mind before you began to write. Do this for each word you study and every time you write the word. The most important thing you have to do is to make sure that you write the word correctly each time you attempt to write it.

II. How to learn each word so well that it won't be forgotten:

1. Study each word as explained above many times, writing it each time from your mental picture of the word. Never pronounce the letters as you study or write the word.
2. Check up on the accuracy of your picture of the word each time you try to write it, and *don't fail* to compare your written word with the printed copy each time you write a word. Do not try to pronounce any word or its letters either while you are studying the word or while you are reading or writing it.
3. Think often of the printed pictures of these words after they have been learned even when you are at play. If any part of your picture of a word is not clear when you try to write it, *look at the copy* to see how it is spelled, noticing especially the part of the word that could not be clearly seen when you tried to picture it to yourself.
4. Notice closely the exact order of the letters that make up the words to be learned each time you study or write them.
5. Think of the meaning of the word each time you write it.
6. Make it a point to notice how the words you are learning are spelled when you see them written or printed.

7. When you have to use any word that you can not spell, do not try to write it. *Never guess* at the spelling of a word. Leave a blank space in your writing for such a word until you can look it up in the dictionary to see how it is spelled. Write it in your letter or composition after you have learned how it is spelled. This is very important and should never be forgotten.
8. Review the words that you are learning every day in the way you were asked to study them and continue these reviews until the words can be correctly written without having to think of how they are spelled. Remember that each new word must be reviewed for many weeks before it is permanently learned.

V. RESULTS OBTAINED BY OUR SUBJECT IN LEARNING TO SPELL

The Ayres-Buckingham list of words for the sixth grade was assigned at the rate of 20 words per day until the entire list of words was learned. The subject was directed to study these words according to the directions for studying given above. The boy's mother was also instructed in this method, and the purpose of the method was carefullly explained to her so that she might assist the boy in his study by checking the accuracy of his procedure and by making doubly sure that the correct method of study and practice was used.[5] Provisions were made for suitable reviews as follows: The boy was told that he must review previous lists during his study periods, using the same method of study that he employed on his new list of words for the day. At a stated time each day (2 p.m.) he came to the Laboratory for his spelling tests. He had his lesson for speech correction at 10 a.m.

In these spelling tests the new list of words was pronounced and the learner wrote them from dictation. After a five-minute interval the list for the preceding day was pronounced to him, and still later in the test the list of words learned three days before was pronounced to the boy and written by him.

[5] The boy and his mother came to Bloomington for a period of six weeks so that the boy might receive special training in "learning to talk" in the psychological clinic at the University by Dr. H. H. Young, Director of the Clinic.

The subject was never told what words he would be asked to spell except that he knew he must spell the new words assigned for the day and review the list for the preceding day.

TABLE 2

Showing per cent of words correctly spelled before and after study by the method described above

DATE (1926)	INITIAL TEST	SCORE AFTER STUDYING WORDS	SCORE 24 HOURS AFTER STUDY TEST	SCORE 3 DAYS AFTER STUDY TEST	PER CENT OF GAIN	PER CENT OF GAIN RETAINED AFTER THREE DAYS
July 22	20	95	100	100	75	75
July 23	35	100	95	100	65	65
July 24	30	100	80	95	70	65
July 25	35	100	95	100	65	65
July 26	25	100	95	100	75	75
July 27	40	95	90	95	45	45
July 28	30	100	100	100	70	70
July 29	25	100	95	100	75	75
July 30	20	95	100	95	75	75
July 31	30	100	100	95	70	65
August 1	30	100	100	100	70	70
August 2	35	100	100	95	65	60
August 3	25	95	100	100	70	75
August 4	30	100	95	100	70	70
August 5	25	100	100	95	75	70
August 6	20	95	100	100	75	80

As the table shows, this learner missed only five words out of 320 on the tests taken the day after he had been given the words to learn. Three days after these words were assigned he missed only six words out of the 320 words learned in the sixteen days. He was, therefore, 98.9 per cent accurate on this list of words four days after the words had been assigned.

To get a measure of the amount of improvement made by our subject, each new list of words was pronounced to the boy before it was assigned for study and the score made on this initial test was compared with the score made on the list after it had been studied in the way indicated in the preceding section. These spelling drills and tests were continued two weeks, during which

time all the words for the sixth grade in the Ayres-Buckingham list and some of the words for the fifth grade were mastered.

Table 2 gives the results obtained and indicates the rate of improvement made by this handicapped boy when the type of direction described in the preceding section was given him. A mere glance at this table will reveal the marked improvement he made. In fact, the boy learned to spell over 300 words in about two weeks and he could still spell these words after a lapse of three days almost as well as he could spell them the day after he had studied them.

At the end of the experiments, or 18 days after our instruction in spelling began, the boy was given a spelling test of 50 words selected at random from the Ayres-Buckingham list of words for the sixth grade. These words were pronounced to the boy in the usual way. He made a score of 96 per cent on the test, missing only two words out of the entire list.

VI. RETENTION OF THE SPELLING HABITS ACQUIRED AND INTERFERENCE OF THE MANY WRONG SPELLING HABITS PREVIOUSLY FORMED

That this learner needed careful guidance and continued help until the new study and spelling habits had become firmly established is shown by the fact that after the boy went home from the University in August, 1926, and started into school in September of that year, he became more careless about his methods of study and practice in this subject and was almost mastered by his old spelling habits. In fact, the newly formed habits did not get enough errorless practice to establish them thoroughly. In this situation the natural tendency for these old spelling habits to reassert themselves proved almost irresistible with the type of encouragement and help which this boy received at school. The result was an arrest in the learning process.

This retardation was no doubt occasioned (1) by the pressure of the boy's other work; (2) by the fact that the boy came under the guidance of a new and unsympathetic teacher who had no special interest in this boy nor in his special handicap; and

lastly (3) by the fact that it takes so long to establish any habit that must be made truly automatic, like the spelling and writing of a word. The needed encouragement and help was, therefore, not given the boy in school. The result was that he did not practice many of the correct spelling habits which he had formed and that his other problems and difficulties diverted his attention from the problem of learning to spell to such an extent that this instance of learning was neglected. But for the encouragement and help of his mother there would doubtless have been a complete reversion to type. With her assistance and help he *fixed* enough of the spelling habits learned to meet his actual needs. This is shown by the fact that no spelling errors have occurred in any of his correspondence with the writer.

His case of learning was, therefore, like every other instance of learning where the learner's advancement is slowed down and sometimes permanently arrested because neither the teacher nor the learner has a clear idea of just what must be done to succeed in that instance of learning[6] or how the many tendencies to error and the special difficulties which the learner encounters can be successfully avoided or overcome. Without this knowledge no learner can test the accuracy of his responses, and without the latter no real progress in learning can be made.

In the present instance of learning to spell the general discouragement occasioned by our subject's inability to solve his speech difficulty affected, no doubt, his capacity to master the problems encountered in learning to spell. His experience, therefore, emphasizes the need for special direction and help in taking the final step in every learning process; *namely, establishing by much errorless practice the exact habits to be formed.* Without this needed direction, encouragement, and help, the correct spelling habits could not be formed by our subject nor, we believe, by most normal learners in this field. In other words, the process of learning to spell presents difficulties to the learner which he, unaided, will be unable to meet successfully.

[6] It will be recalled that little help could be given in our experiments on the fixing of the habits to be acquired. See Part II of "Directions for studying the words."

VII. CONCLUSIONS

The following conclusions seem warranted from the data collected in our study of this case:

1. Learners of this subject are unable to discover for themselves the best method of observing the word and the best method of fixing the order of the letters and syllables in the words to be learned. Our subject could not do it, and it seems probable that if any child with normal or slightly superior intelligence could make these discoveries for himself, our subject, because of his speech handicap and strong desire to learn, would have been able to discover them.

2. Testing the accuracy of the learner's study and spelling responses, preferably by the learner himself, is absolutely necessary for establishing correct spelling habits. This is but another way of saying that the correct spelling response must in some way or other be selected and repeated often enough to establish it. This selecting or testing of the accuracy of the response is not always consciously or purposely done, but the correct response *must be* selected and repeated if any learning takes place. The learner's rate of progress in any case of learning will, therefore, be greatly increased if he will make it a point to check the accuracy of his responses or work himself. This is not only true in learning to spell but is a principle that holds for other types of learning as well. It was our subject's failure to do this thing that led to the standardization of the many wrong and grotesque spelling habits which he regularly used.

3. The most difficult problem encountered by our subject in learning to spell was not to find and use the correct method of procedure in learning the words but to overcome the tendency to try to spell by sound and to unlearn the many wrong spelling habits which he had established by his futile attempts to master this subject. We believe that this unlearning of wrong spelling habits established because of inadequate direction and careless control over the study and spelling responses, represents a problem that is equally troublesome for unhandicapped learners

and that no learners of this subject will be able to master this difficulty without proper direction and expert help from a teacher who knows exactly what a learner of this subject must do to eliminate these tendencies to error and the wrong spelling habits which are naturally formed in the course of the learning. Much special help must be given on this point to enable a learner to take this necessary step in learning to spell.

4. Learners of this subject also need guidance and help *to establish* the correct spelling habits for the words which they need to use. The average learner of this subject will assume that the habit has been acquired long before it is finally established. The results are mistakes, practice in error, and failure to progress. This gives the learners an additional problem to solve in the elimination of the wrong spelling habits which, for this reason, are so often acquired. This conclusion is forced by our subject's experience with the problem of learning to spell when he returned to school after the experiments and instruction described in this report had been given.

COMPARATIVE VALIDITY OF PRIMARY INTELLIGENCE TESTS

PAUL V. SANGREN

Western State Teachers College, Kalamazoo, Michigan

THE PROBLEM

The question of the degree to which intelligence tests measure that which they purport to measure remains only partially answered in spite of the rather large number of helpful investigations already conducted along this line. The validity of intelligence tests will undoubtedly continue to be an important subject for study on the part of students of education for many more years. However, every study which reports additional facts concerning the validity of the measures of intellect should aid in the determination of the present status of mental measurement and suggest means for improving upon the existing tests and scales. The specific question which the facts presented in this report may partially answer is: *What is the comparative validity of intelligence tests applied to first grade children?*

THE METHOD

Four examiners who had had considerable experience in giving both group and individual intelligence tests administered tests with the aid of the teachers to four groups of first grade children of the training schools of Western State Teachers College, Kalamazoo, Michigan, according to the following plan:

Test	*When Given*
Stanford Revision of Binet	November 1 to December 15, 1926
Otis Group Intelligence Scale Primary Examination Form A	January 2, 1927

Rhode Island Intelligence Test, Form A... January 2, 1927
Detroit First Grade Intelligence Test, Form A..... January 3, 1927
Kingsbury Primary Group Intelligence Scale, Form A..... January 3, 1927
Pressey Primary Classification Scale, Form A..... January 3, 1927
Haggerty Intelligence Examination Delta I. January 4, 1927
Pintner-Cunningham Primary Mental Test, Form A..... January 4, 1927

In general the testing conditions were good and since the scoring and checking were carried on by two carefully trained persons, the results may be considered as fairly accurate. In all there were 118 first grade pupils taking various tests but since not all of these pupils were given all of the tests, the number was built up to exactly 100 cases in order to facilitate the statistical work.

THE RESULTS[1]

Table 1 gives the distributions of mental ages in months of the first grade pupils in terms of the various intelligence tests, together with the median mental ages, median chronological ages, and standard deviations of the distributions. A number of very interesting facts appear from a study of table 1 which may be briefly summarized as follows:

1. It is very evident that the group of children included in this investigation comprises approximately a normal group of first grade children so far as may be judged from the central tendency of the different distributions of mental ages on the various intelligence tests. Specifically, this is clear from the fact that six of the eight intelligence tests show the pupils to have a median mental age which is somewhere between 84 and 89 months. Furthermore, the median chronological age of the group is 83 months, which would be exactly normal according to the generally accepted age-grade standards for school children.

[1] Due to limited space available for printing this article it has not been possible to include all of the statistical results of the study. A more complete report is available in a bulletin entitled "Statistical Comparisons of Certain Intelligence Tests," Bureau of Educational Research, Western State Teachers College, Kalamazoo, Michigan.

TABLE 1

Distributions of mental ages in months of the first grade pupils in terms of the various intelligence tests

M.A.	TEST							
	Pressey	Otis	Pintner-C.	Haggerty	Kingsbury	Detroit	Rhode Island	Binet*
132–135					1			
128–131								
124–127	2	1			1			
120–123	2	2			1			
116–119	3	9			7			
112–115	2	7			4			
108–111	3	9	1		3			1
104–107	3	7	10	1	3			
100–103	11	10	12	1	4	6		2
96–99	5	5	15	7	6	12		11
92–95	8	8	18	6	4	20		9
88–91	7	10	16	14	8	19	5	22
84–87	13	8	11	20	15	13	44	17
80–83	8	9	6	17	6	9	17	11
76–79	5	7	4	8	14	5	4	10
72–75	12	4	2	9	10	5	15	8
68–71	6	1	1	10	5	2	3	3
64–67	1	3	1	2	3	5	1	3
60–63	3		2	5	2	1	3	1
56–59	3				3	3	1	2
52–55	2		1					
48–51	1						1	
44–47								
36–39							2	
32–35							1	
28–31							1	
24–27							2	
20–23								
Total	100	100	100	100	100	100	100	100
Median M.A.	86.8	96.0	93.3	83.8	85.9	89.5	83.8	86.0
P.E.	1.14	1.0	0.71	0.66	1.13	0.72	0.94	0.67
Median C.A.	83	83	83	83	83	83	83	83
Standard Deviation	6.88	14.85	10.48	9.81	16.72	10.68	13.88	9.93

* Since the Stanford-Binet test was given from one-half to two months earlier than the group tests it was necessary to bring the mental ages of the pupils on the Binet test up to the date of January 3. This was handled statistically by assuming that the intelligence quotients of pupils would remain constant and that the pupils would have made a sufficient increase in Binet mental age to maintain the same intelligence quotient.

2. The rather marked difference in median mental ages of the pupils according to the different tests is interesting to note. The Otis Intelligence Test, for example, would give the pupils a median mental age 13 months in excess of their chronological age. The Pintner-Cunningham Examination would give the pupils a median mental age 10 months in excess of their chronological age. On the other hand, the Haggerty and Rhode Island tests would place the median mental age only 1 month in excess of the chronological age.

3. If one were to consider the median chronological age as a criterion of the normality of the group tested the validity of the various intelligence tests, in terms of the extent of their deviation from the norm, would rank them as follows:

1 and 2. Haggerty and Rhode Island
3. Kingsbury
4. Stanford-Binet
5. Pressey
6. Detroit First-Grade
7. Pintner-Cunningham
8. Otis

On the other hand, if the Stanford-Binet were considered as a criterion of validity in determining the median mental age of this group of children, the ranking of the tests would be as follows:

1. Stanford-Binet
2. Kingsbury
3. Pressey
4 and 5. Haggerty and Rhode Island
6. Detroit First-Grade
7. Pintner-Cunningham
8. Otis

4. There is a rather marked difference in the range of mental ages as determined by the different intelligence tests. In the case of the Stanford-Binet, for example, the mental ages of the group vary from 52 to 111 months; on the Rhode Island Intelligence Test the mental ages vary from 24 to 91 months; on the Kingsbury the range is from 56 to 135 months; on the Pressey Primary Scale from 48 to 127 months. Observations of the differences in intelligence, therefore, on the various scales would indicate that whereas the pupils on one test might have a mental age as low as two years, on another test the lowest mental age would be five years and four months; vice versa, on the Rhode Island Mental Test, for example, the highest mental age would be seven years and seven months, whereas on the Kingsbury the highest mental age

would be eleven years and three months. These facts alone seem to indicate that the intelligence tests must vary a good deal in their validity as determiners of the true mental ages of pupils.

5. The standard deviations of the distributions of mental ages on the various tests differ considerably, ranging from 9.81 months to 16.88 months. Assuming that in a more valid test the standard deviation of the scores will tend to be somewhat smaller, one may list the various tests in the order of their desirability as follows:

1. Haggerty
2. Stanford-Binet
3. Pintner-Cunningham
4. Detroit First-Grade
5. Rhode Island
6. Otis
7. Kingsbury
8. Pressey

6. It is evident that there is a great deal of overlapping in the mental ages obtained by the pupils on the different tests. For example, although the lowest mental age given on any test is 24 months and the highest is 135 months, in no test do more than 6 per cent of the mental ages fall under the next lowest ranging test, and in no test does more than 1 per cent of the mental ages exceed the next highest ranging test.

A table included in the original report of this study giving distributions of the intelligence quotients obtained by the first grade pupils on the various intelligence tests together with the median intelligence quotients, normal intelligence quotient and standard deviations substantiates to a marked degree the facts found from a study of table 1.

A graphic representation of the distributions of mental ages on the different tests as reported in table 1 was also prepared in the original report of the study. The mental ages obtained on the different tests, in this graphic representation, were transmuted into standard units.[2] By this means the mental ages on the different tests were made strictly comparable, enabling one to make direct comparisons between the distributions of the mental ages on the various tests. A study of this figure revealed the following interesting facts:

[2] See Kelley: Statistical Method, p. 115.

1. The distributions of the mental ages of the same group of pupils on the various tests are not of the same type on any two tests even though the units have been reduced to a comparable basis.

2. By inspection the curves of frequency of the various distributions of mental ages may be roughly characterized as follows:

a. Definitely skewed toward the low end of the scale—Rhode Island, Detroit, Pintner-Cunningham.

b. Definitely skewed toward the high end of the scale—Kingsbury.

c. Showing neither definite skewness nor tendency to normality—Otis.

d. Approximate normality—Haggerty, Pressey, Binet.

3. One may make a rough approximation concerning the relative validity of the eight tests used on the basis of the characterization on item 2 above on the assumption that a normal distribution is most likely to describe the result on a really valid test of intellect and that the least valid test shows the greatest departure from normality. On such a basis one could roughly list the tests in their order about as follows:

1. Haggerty
2. Stanford-Binet
3. Pressey
4. Kingsbury
5. Otis
6. Pintner-Cunningham
7. Detroit First-Grade
8. Rhode Island

Table 2 gives the coefficients of correlation obtained between the mental ages of the pupils as determined by the various intelligence tests. Similar tables of coefficients of correlation were calculated for the scores and intelligence quotients obtained, with approximately the same general results as those shown in table 2. Among the important facts found from a study of table 2 the following may be listed:

1. Considerable variation exists in the degree of correlation found between the mental ages of the pupils on the various tests. For example, the coefficient of correlation obtained between the Rhode Island and the Binet is .432, while that between the Otis and the Pressey is .789.

2. Considering the fact that so narrow a range of talent as the single first grade group is used, the intercorrelation among the tests runs fairly high, the lowest being an average intercorrelation of .522 for the Rhode Island and the highest being .708 for the Otis, and the average intercorrelation for all of the tests being .639. From this one might safely conclude that the various tests are measuring abilities at least closely related if not exactly the same.

TABLE 2

Intercorrelation between mental ages of one hundred first grade pupils as determined by the various intelligence tests

TESTS	BINET	PRESSEY	OTIS	HAGGERTY	KINGSBURY	RHODE ISLAND	DETROIT	PINTNER-C.
Binet		.672	.631	.575	.579	.432	.521	.655
Pressey			.789	.729	.658	.469	.688	.643
Otis				.761	.773	.513	.733	.759
Haggerty					.643	.545	.697	.753
Kingsbury						.433	.603	.642
Rhode Island						.627	.627	.639
Detroit								.732
Average	.580	.664	.708	.672	.619	.522	.657	.689

Average intercorrelation .639.

3. Assuming that the extent of intercorrelation between the various intelligence tests gives some evidence of their comparative validity, one might list the tests in order of their validity as follows:

1. Otis
2. Pintner-Cunningham
3. Haggerty
4. Detroit First-Grade
5. Pressey
6. Kingsbury
7. Stanford-Binet
8. Rhode Island

Table 3 presents the partial correlations obtained between the various intelligence tests and the two criteria when chronological

age is held constant. The two criteria are Binet mental age and a composite mental age obtained from the seven group tests each equally weighted. These correlations were calculated on the assumption that the test showing higher correlation with chronological age than another does is less valid. The following are the main facts contained in table 3:

1. There is considerable variation in the extent of the correlation found between the various tests and the Stanford-Binet or the composite of the seven other tests when age is held constant. Thus, the partial coefficients obtained between the group tests and the Stanford-Binet range from .425 to .678, while between the separate tests and the other seven employed the coefficients run from .647 to .861.

TABLE 3

Partial correlation between various intelligence tests and a criterion, chronological age held constant

TEST	CRITERION	
	Binet	Seven group tests
Pressey	.650	.857
Otis	.600	.861
Haggerty	.542	.800
Kingsbury	.559	.647
Rhode Island	.425	.690
Detroit First-Grade	.479	.743
Pintner-Cunningham	.678	.751

2. Considering the Stanford-Binet as a criterion, when age is not a variable factor, the various tests may be listed in order of their validity as follows:

1. Pintner-Cunningham
2. Pressey
3. Otis
4. Kingsbury
5. Haggerty
6. Detroit First-Grade
7. Rhode Island

Considering the composite from the seven other tests applied as a criterion, and with age held constant, the tests may be listed in order of their validity as follows:

1. Otis
2. Pressey
3. Haggerty
4. Pintner-Cunningham
5. Detroit First-Grade
6. Rhode Island
7. Kingsbury

The application of the various intelligence tests to the same first grade pupils leads to results like the following:

PUPIL NUMBER	MENTAL AGE IN MONTHS ON							
	Binet	Pressey	Otis	Pintner-C.	Haggerty	Kingsbury	Detroit	Rhode Island
1	92	102	98	98	98	118	96	81
2	86	108	113	93	92	87	99	75
3	84	62	75	74	70	62	80	48
4	83	95	94	90	79	75	85	87
5	73	72	90	90	90	77	91	81
6	96	110	125	102	97	134	99	84
7	76	60	75	89	69	86	84	72
8	89	121	116	103	106	96	92	84
9	99	126	115	106	88	106	98	90
10	85	87	96	94	82	78	94	84

The marked differences in mental age and intelligence quotient obtained by the pupils on the various tests raise the following questions:

1. Which is the correct mental age or intelligence quotient?
2. To what extent do the mental ages or intelligence quotients on a given test deviate from criterion mental ages or intelligence quotients?
3. To what extent will combinations of tests improve their validity in giving criterion mental ages and intelligence quotients?

PUPIL NUMBER	INTELLIGENCE QUOTIENTS ON							
	Binet	Pressey	Otis	Pintner-C.	Haggerty	Kingsbury	Detroit	Rhode Island
1	102	113	109	109	109	131	107	90
2	98	123	128	106	103	99	113	85
3	110	82	99	97	92	82	105	63
4	91	104	103	99	87	82	93	96
5	96	95	120	118	118	101	120	107
6	117	134	152	124	118	163	121	102
7	101	80	100	119	92	115	112	96
8	99	134	129	114	118	107	102	93
9	115	147	134	123	102	123	114	105
10	90	93	102	100	87	83	100	89

Table 4 gives the average deviations in months of the mental ages obtained by the pupils on the various group intelligence tests in terms of the criteria. For example, on the average the mental ages obtained by the 100 first grade pupils on the Otis test deviate from the Binet mental ages of the same pupils by 12.9 months, and from their composite mental ages on the seven group tests by 9.7 months. The table should be read throughout in this manner.

The following are some important observations based on a study of table 4:

1. There is a good deal of variation in the degree to which the mental ages, obtained by pupils on the different tests, deviate from the mental ages obtained on the Stanford-Binet test and on the group tests combined. There is an average deviation from the Stanford-Binet mental age of 7.6 months per pupil on the Haggerty test; the Otis shows an average deviation from this criterion of 12.9 months. Similarly, the Detroit mental ages show an average deviation from the combined group test mental ages of but 4.8 months while the Rhode Island mental ages show an average deviation of 11.1 months from the same criterion.

2. There is no group test on which pupils obtain mental ages which, on the average, deviate from the Stanford-Binet mental ages by less than 7.6 months; and there is no group test on which pupils obtain

mental ages that, on the average, deviate from the composite group test mental ages by less than 4.8 months.

3. Using the mental ages of the Stanford-Binet as a criterion of the validity of the various group tests one may list the tests in the order of their average deviation from the criterion as follows:

1. Haggerty
2. Detroit First-Grade
3. Pintner-Cunningham
4. Pressey
5. Kingsbury
6. Rhode Island
7. Otis

TABLE 4

Average deviations of mental ages of 100 first grade pupils obtained on various intelligence tests from the mental ages obtained on the criteria

TEST	BINET	SEVEN GROUP TESTS
Otis	12.9	9.7
Pressey	10.0	6.8
Pintner-Cunningham	9.5	5.8
Haggerty	7.6	6.6
Kingsbury	10.3	7.6
Detroit First-Grade	7.7	4.8
Rhode Island	10.9	11.1

Using the composite mental ages obtained from the seven group tests as the criterion of validity the tests may be listed in the order of their average deviation from the criterion as follows:

1. Detroit First-Grade
2. Pintner-Cunningham
3. Haggerty
4. Pressey
5. Kingsbury
6. Otis
7. Rhode Island

Table 5 gives the average differences per pupil in months of mental ages between all possible pairs of the seven group tests and the mental ages as determined by the Stanford-Binet and

the seven group tests as a composite. For example, on the average, the composite mental ages obtained from the Detroit and Haggerty deviate from the Stanford-Binet mental age by 6.8 months per pupil and from the composite of the seven group tests by 3.4 months per pupil. The table should be read

TABLE 5

Average differences in mental age of 100 first grade pupils on pairs of tests and the criteria

BINET		SEVEN GROUP TESTS	
Detroit-Haggerty	6.81	Kingsbury-Detroit	3.45
Pintner-C.-Haggerty	6.99	Pressey-Detroit	3.48
Pressey-Haggerty	7.07	Pintner-C.-Haggerty	3.50
Kingsbury-Haggerty	7.13	Otis-Rhode Island	3.60
Pintner-C.-Rhode Island	7.51	Otis-Haggerty	3.62
Kingsbury-Detroit	7.53	Pintner-C.-Pressey	3.87
Kingsbury-Rhode Island	7.63	Pressey-Haggerty	4.07
Otis-Rhode Island	7.72	Pintner-C.-Detroit	4.08
Detroit-Rhode Island	7.85	Detroit-Haggerty	4.09
Pressey-Rhode Island	7.89	Kingsbury-Haggerty	4.24
Pressey-Detroit	7.91	Pintner-C.-Kingsbury	4.56
Pintner-C.-Detroit	8.02	Otis-Detroit	5.00
Rhode Island-Haggerty	8.23	Pintner-C.-Rhode Island	5.00
Otis-Haggerty	8.05	Kingsbury-Rhode Island	5.12
Pintner-C.-Kingsbury	8.61	Kingsbury-Pressey	5.32
Pintner-C.-Pressey	8.76	Pressey-Rhode Island	5.68
Kingsbury-Pressey	9.11	Otis-Pressey	5.99
Otis-Detroit	9.15	Detroit-Rhode Island	6.10
Otis-Pressey	10.16	Otis-Kingsbury	6.33
Otis-Kingsbury	10.50	Otis-Pintner-C	7.25
Otis-Pintner-C	10.84	Rhode Island-Haggerty	7.62

throughout in this manner. Among the important facts appearing in table 5 are the following:

1. In terms of either the Stanford-Binet or the composite of the seven group tests as a criterion of mental age the composite mental ages from pairs of group tests show a wide variation in the average deviation from the criterion, some pairs showing twice the deviation that others do.

2. The extent of the difference in mental ages obtained from pairs of tests as a composite and the seven group tests as a composite is considerably less than the average deviation from the Binet mental ages the former difference running from 3.4 to 7.6 months, while the latter runs from 6.8 to 10.8 months. Undoubtedly the greater apparent accuracy of the pairs of tests in terms of the seven group tests as a criterion comes about because the pairs of tests are included in the criterion.

TABLE 6

Average differences in intelligence quotients of 100 first grade pupils on pairs of tests and the criteria

BINET		SEVEN GROUP TESTS	
Detroit-Haggerty	8.20	Kingsbury-Detroit	4.17
Pressey-Haggerty	8.23	Pressey-Detroit	4.29
Pintner-C.-Haggerty	8.31	Pintner-C.-Haggerty	4.37
Kingsbury-Haggerty	8.69	Otis-Haggerty	4.43
Kingsbury-Detroit	8.87	Otis-Rhode Island	4.43
Pressey-Detroit	9.07	Pintner-C.-Pressey	4.73
Kingsbury-Rhode Island	9.26	Pintner-C.-Detroit	4.88
Pintner-C.-Rhode Island	9.31	Detroit-Haggerty	5.05
Otis-Rhode Island	9.39	Kingsbury-Haggerty	5.12
Pintner-C.-Detroit	9.50	Pressey-Haggerty	5.14
Pressey-Rhode Island	9.70	Pintner-C.-Kingsbury	5.67
Detroit-Rhode Island	9.75	Otis-Detroit	5.88
Otis-Haggerty	9.78	Pintner-C.-Rhode Island	6.09
Rhode Island-Haggerty	10.18	Kingsbury-Rhode Island	6.16
Pintner-C.-Pressey	10.55	Kingsbury-Pressey	6.47
Pintner-C.-Kingsbury	10.88	Pressey-Rhode Island	6.95
Otis-Detroit	10.92	Otis-Pressey	7.23
Kingsbury-Pressey	10.97	Detroit-Rhode Island	7.51
Otis-Pressey	12.33	Otis-Kingsbury	7.56
Otis-Kingsbury	12.88	Pintner-C.-Otis	8.68
Pintner-C.-Otis	13.46	Rhode Island-Haggerty	9.20

3. Direct reading from the table will show the relative efficiency with which the various pairs of tests determine the mental ages according to the two criteria. The only general statement which may be made on the basis of this comparison of the pairs is that certain combinations of the Detroit, Haggerty, Pintner-Cunningham, and Pressey seem rather consistently to lie at the top and certain Otis and Rhode Island combinations tend rather consistently to run toward the bottom.

Table 6 gives the average differences in composite intelligence quotients obtained from pairs of group tests and the intelligence quotients obtained from the Stanford-Binet and the seven group tests as a composite. This table does not contribute many facts not found in table 5, but it does seem to show that, whether intelligence quotients or mental ages are considered, the relative validity of the various pairs of tests in predicting criterion mental ages or intelligence quotients is approximately the same. In short, table 6 substantiates the evidence presented in table 5.

TABLE 7

Agreement of three-fold sectioning of 100 first grade pupils on mental ages from one group test with sectioning on criterion mental ages

TEST	BINET			SEVEN GROUP TESTS		
	Per cent correctly sectioned	Per cent displaced		Per cent correctly sectioned	Per cent displaced	
		1 section	2 sections		1 section	2 sections
Pressey	63	35	2	75	25	0
Otis	60	36	4	78	22	0
Pintner-C	52	44	4	74	26	0
Haggerty	56	39	5	73	27	0
Kingsbury	60	37	3	73	27	0
Detroit	51	42	7	71	28	1
Rhode Island	51	41	8	55	45	0

It is interesting to note that composite intelligence quotients obtained from the pairing of group intelligence tests do not differ from the Stanford-Binet intelligence quotient by less than 8.2 points. If it is accepted that the average error of the Stanford-Binet intelligence quotient itself is 5 points, no pair of primary group tests will be a satisfactory substitute for the Stanford-Binet, and certain pairs would have more than twice the error of the Stanford-Binet itself.

Table 7 presents the facts concerning the agreement between three-fold sectioning of pupils on the basis of their mental ages

obtained from a single group test and on the basis of criterion mental ages. This table should be read as follows: The Pressey mental ages agree with the Stanford-Binet to the extent that 63 per cent of the cases would fall in the same group, 35 per cent would differ by one section, and 2 per cent would differ by two sections; Pressey mental ages agree with the composite mental ages of the seven group tests to the extent that 75 per cent of the cases would fall in the same section, 25 per cent would be displaced by one section, and none would be displaced by two sections. The table may be read throughout in this way.

The important facts found in table 7 may be summarized as follows:

1. Any single group test shows at least 51 per cent of agreement with the Stanford-Binet in classifying the first grade pupils on the basis of mental age and at least 55 per cent agreement with the composite of the seven group tests in a similar classification.

2. Excepting the Rhode Island test, there is no great variation in the extent to which the mental age classifications on the basis of a single test agree with classifications on the basis of the criteria.

3. Using the Stanford-Binet as a criterion for proper classification of pupils the tests may be listed as follows in order of their agreement:

1. Pressey
2. Kingsbury
3. Otis
4. Haggerty
5. Pintner-Cunningham
6. Detroit First-Grade
7. Rhode Island

If the composite of the seven group tests is used as a criterion of classification the various tests would be listed in order of their agreement as follows:

1. Otis
2. Pressey
3. Pintner-Cunningham
4. Haggerty and Kingsbury
6. Detroit First-Grade
7. Rhode Island

A table included in the original report of this study presents the facts concerning the extent of agreement between threefold sectioning of the pupils on the basis of their intelligence quotients obtained from single tests and on the basis of criterion

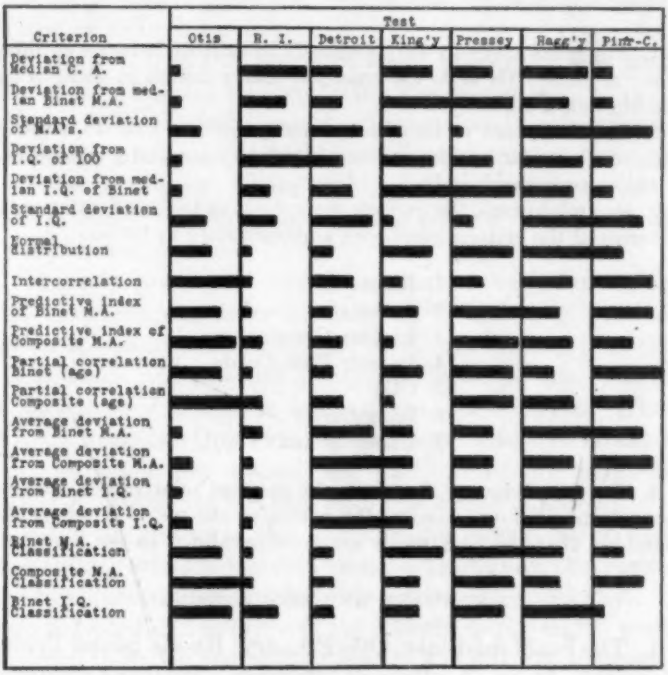

FIG. 1. SHOWING COMPARATIVE VALIDITY OF VARIOUS GROUP TESTS APPLIED TO 100 FIRST GRADE PUPILS IN TERMS OF 19 DIFFERENT CRITERIA

intelligence quotients. This table bears out quite generally the facts presented in the previous table concerning sectioning on the basis of the mental age.

Figure 1 summarizes graphically the facts found in all tables and figures included in this and the original report of the study. In figure 1 the name of each group test appears at the top and the criteria of validity, in terms of which each was checked,

appear at the left. The length of the bar under each test and opposite each criterion indicates whether the test ranked highest, next to highest, second from highest, etc. The higher the ranking, the longer the horizontal bar under the test. Figure 1 brings out the following important facts:

1. Any given test may vary markedly in validity in terms of different criteria. The Otis test, for example, ranks lowest in some respects and highest in others.

2. There appears to be some tendency for the tests to maintain a high, mediocre, or inferior ranking in validity according to all or many of the criteria employed.

3. One might rank the various group tests as to comparative validity in terms of the criteria employed approximately as follows:

1. Haggerty
2. Pressey
3. Pintner-Cunningham
4. Detroit First-Grade
5. Otis
6. Kingsbury
7. Rhode Island

4. The Otis Primary Test shows its greatest relative weakness when the criteria employed involve the norms on the test. It seems likely, therefore, that the Otis norms are more invalid than the test itself.

SUMMARY AND CONCLUSIONS

1. The Stanford-Binet, Otis Primary, Rhode Island Primary, Haggerty Delta I, Pressey Primary, Pintner-Cunningham Primary, Detroit First Grade, and Kingsbury Primary Intelligence tests were applied to 100 first grade children of the training schools of Western State Teachers College, Kalamazoo, Michigan. A statistical study of the results obtained was made for the purpose of investigating the comparative validity of the tests.

2. The comparative validity of the various intelligence tests was studied in terms of such factors as: the nature of the distributions of mental ages and intelligence quotients, the conformance to normal central tendencies, whole and partial

correlations with independent or partially independent measures of intelligence, deviations of mental ages and intelligence quotients of tests taken singly or in pairs from the mental ages and intelligence quotients on criterion measures of intellect, and agreement of single tests with three-fold sectioning of pupils in terms of criteria employed.

3. Perhaps one of the most significant findings of this study is that it corroborates the previously discovered facts that (*a*) judgment of the validity of a test in terms of any single criterion is unsafe, (*b*) a test may be highly valid in one respect, but quite the reverse in another, (*c*) the validity of an intelligence test is always a matter of degree, and (*d*) the perfectly valid test has not yet been constructed.

4. There is practically always a marked variation in the extent to which the different tests agree with any accepted criterion of validity in intelligence tests. It is often true that the test which appears highly valid in terms of one criterion may appear very inferior in terms of another criterion. Thus, it is found that the Otis Primary and Stanford-Binet correlate highly, although the mental age and intelligence quotients obtained by pupils on the two tests differ very markedly.

5. While the results of this study do not enable one to state with certainty what is the comparative validity of the various group intelligence tests applied, the author does feel that, for the group tested and in terms of the criteria employed, he would be justified in listing tentatively the tests in order of their comparative validity approximately as follows:

1. Haggerty Intelligence Examination, Delta I
2. Pressey Primary Classification Scale, Form A
3. Pintner-Cunningham Primary Mental Test, Form A
4. Detroit First Grade Intelligence Test, Form A
5. Otis Primary Mental Examination, Form A
6. Kingsbury Primary Intelligence Scale, Form A
7. Rhode Island Intelligence Test, Form A

6. The findings of this study may have little direct bearing upon the comparative validity of the intelligence tests applied

when other groups of primary children, such as second or third grade pupils, are used as subjects or when other criteria of validity are employed. In the interest of thoroughness and accuracy the study should be carried on to cover other groups of children and other criteria of validity in intelligence tests.

NOTES AND NEWS

SIXTH INTERNATIONAL CONFERENCE OF PSYCHOTECHNIC WILL BE HELD IN BARCELONA, SPAIN SEPTEMBER 25 TO 29, 1929

Honorary President: The King of Spain.

Honorary Committee: The Minister of Work, The Minister of Economy, The Minister of Public Works, (And other authorities).

Executive President: Mr. D. Cesar de Madariago, Director of the Institution of Vocational Guidance of Madrid.

Secretary General: Dr. E. Mira, of Barcelona.

Questions to be treated in the symposiums:

I. "General criticisms of tests proposed for the study of industrial fatigue," by Messrs. Wyatt, Dheer, Frois.

II. "Minimum of statistical measures necessary for the standardization of a test with psychotechnic aims," by Messrs. Fuentes Martianez, Sirkin, Pieron-Fessard.

III. "Psychotechnical methods for the study of personality," by Messrs. Ferrari, Lafora, Porter.

Besides these symposiums a number of conferences will be held concerning the different aspects of psychotechnic, and special lectures will be delivered by some of the most prominent psychologists of Europe.

The official languages will be Spanish, French, English and German.

There are three kinds of members:

1. Associate members, those who are particularly related to some institution or laboratory devoted to psychotechnic. Membership fee, $3.00.

2. Adherent members, who are interested in these problems but who are not psychotechnicians. Membership fee, $1.50.

3. Honorary members, institutions or organizations devoted to these problems. Membership fee, $10.00.

To encourage the largest possible attendance at this Conference the Compania Espanola de Turismo has prepared a schedule which includes the journey to Barcelona and visits to Paris, Madrid and Toledo under the following conditions:

September 11. Start from New York on the steamer Aquitania to Cherbourg.

September 18. Arrive at Cherbourg and start to Paris.

September 19. Arrive at Paris in the morning and start in the evening to Madrid in sleeping car.

September 20. Arrive in the morning in Madrid and visit the city.
September 21, 23. Visit the city of Madrid (museums, monuments, etc.) including a day's excursion to Toledo by automobile.
September 24. In the morning start for Barcelona, arriving at night.
September 25, 29. Stay in Barcelona during the Conference.
September 30. Start in the afternoon for Paris in sleeping car.
October 1, 4. Stay in Paris.
October 5. In the morning start from Paris to Cherbourg.
October 5. In the afternoon start to New York on the steamer Mauretania.

Cost of the trip: Including all tickets for the trip by first class, all meals, excursions, trips, and extra fares for sleeping car, etc., the amount would be 5715 pesetas or $819.00 approximately.

If the trip on steamer each way is made by second class, the cost would be 3960 pesetas or $591.00 approximately, and the other accommodations remain unchanged.

All persons interested in this schedule may write directly to the Compania Espanola de Turismo, Plaza de Catalena, No. 1, Barcelona, Spain.

Any correspondence concerning the Conference should be addressed to Dr. E. Mira, "Real Politecnico Hispano-Americano," Rue Urgel 187, Barcelona, Spain.

The name of *Children, The Parents' Magazine* has been changed to *The Parents' Magazine*. As heretofore, the editorial content will deal exclusively with (1) the care and training of children from crib to college, (2) Family relationships and home life, (3) The management and equipment of homes in which there are children.

A new book published by *The Parents' Magazine* and W. W. Norton and Company entitled *The Modern Baby Book and Child Development Record* contains a descriptive outline of normal child development including the growth of intellect and personality as well as of the body. A section of family history is followed by a birth record, and a section on general health. There are sections for recording the child's development at three, six, nine, twelve and eighteen months and every year thereafter up to the sixteenth year. Normal standards of development are presented for comparison.

The National Film Estimate Service, organized recently by Nelson L. Greene, 5 South Wabash Avenue, Chicago, will select from current motion pictures those most suitable for children. The Service will print a list of films each month in *The Parents' Magazine* and *The Educational Screen* suitable for children under fifteen years, and for youths from fifteen to twenty. Judgments on sixty-seven pictures have just been published in the July issue of *The Parents' Magazine* and of these only thirteen are

recommended for children of less than fifteen years and only twenty-four are recommended for the older group.

The trustees of the John Simon Guggenheim Memorial Foundation announce a gift of $1,000,000 to establish a system of exchange Fellowships between the United States and Latin America. While the Fellowships offered by the Foundation have been available, from the beginning, for study in any country of the world, the number of applicants has been so large that the creation of this distinct system of fellowships reserved for Latin Americans, on an exchange basis, represents an important extension of the Foundation's work. The first of the Latin American Fellowships will be granted in the Republic of Mexico early in 1930. Fellowships to Americans for the study of Latin American problems have already been awarded to six scholars from the universities of this country.

The following news items come from Stanford University: Dr. R. W. Husband has been appointed Instructor of Psychology at the University of Illinois for the coming year; Mr. Homer Weaver becomes Assistant Professor of Psychology at the University of Arizona while Mr. Robert G. Bernreuter goes to Washington University, St. Louis, as Instructor of Psychology. Dr. Milton B. Jensen will leave the staff of the Psychology Department at Stanford to become Associate Professor of Psychology at Central State Teachers College, Mount Pleasant, Michigan.

The Commonwealth Fund Division of Publications has recently published a Directory of Psychiatric Clinics for Children in the United States. Under each state is given a list of local clinics providing regular service for the study and treatment of conduct problems, the number of children handled in each clinic during the past year, and a description of the institutions and community resources in mental hygiene under state governmental auspices. More than 300 of these clinics have been established since 1922 under the direction of the National Committee for Mental Hygiene. Within the past year more than 40,000 children were examined and treated. Those interested may secure copies of this Directory by addressing The Commonwealth Fund Division of Publications, 578 Madison Avenue, New York City. The price per copy is 75 cents.

The World Book Company announces the publication of a Bookkeeping Test the authors of which are Fayette H. Elwell and John Guy Fowlkes, of the University of Wisconsin. These tests (Forms A and B) are designed to furnish a reliable, valid, and comparable measure of achievement in bookkeeping for use in high schools and business col-

leges. They are intended primarily for measuring general achievement, but may be used for analysis of the basic principles of subject matter. Each test has nine parts which employ such types of objective questions as true-false, multiple choice, completion, and identification.

THE JOURNAL OF APPLIED PSYCHOLOGY, Vol. IV, 1920, published "Tables to Facilitate the Computation of Coefficients of Correlation by the Rank Difference Method" by the Scott Company Laboratory. Copies of these Tables in handy pamphlet form may be purchased from THE JOURNAL OF APPLIED PSYCHOLOGY, Ohio University, Athens, Ohio, at the following prices: Single copies, 20 cents; ten or more copies at 15 cents each; in case of very large orders a somewhat lower price will be quoted.

BOOK REVIEWS

ROBERT LEE MORTON. *Laboratory Exercises in Educational Statistics.* Silver, Burdett and Company, 1928. 142 + lii pp.

Laboratory Exercises in Educational Statistics is a work book by the aid of which one may apply the Dalton Plan, the contract plan, drill or what have you at the college level. It is more than a mere collection of exercises and tables. It provides an outline of a course in statistics. Fifty exercises are given, most of which contain several practice problems. Each exercise is introduced by a brief discussion and usually a problem worked out for illustrative purposes. Then specific problems are given to the student to work. There follows a series of questions dealing with interpretations and other aspects of statistics. Finally a list of references by author and page is given. The number of references ranges from 0 to 11 with a mean of about 5½ and a standard deviation of probably three. (And if we interpret the author's statistical attitude we believe that he will resent any attempt to imply statistically that he ever assigns half a reference.)

The lessons are well planned. Answers are provided for all the problems but are placed in a separate section. The tables are fairly comprehensive and satisfy most statistical needs. The author is to be congratulated because he arranged the tables so as to require as little turning of the leaves as possible and also for including *five* place logarithms. The beginner will find a number of practical suggestions about mechanical devices and labor saving methods.

A considerable amount of space is devoted to correlation. Most of the methods of correlation discussed are common types which assume fairly fine degrees of measurement. More recognition is needed for methods of correlation which deal with rough measures or categories such as the four or five point scale so commonly used in educational work. The reviewer would also like to see more space devoted to the problem of sampling.

However, the book is undeniably good. The wording is concise, clear and to the point. The questions are well chosen and calculated to provoke further thought and reading. They impress the reviewer as being a good device for preventing the student from becoming a mere rule of thumb worker—an humble turner of the wheel which grinds out figures in the form of statistics but whose meaning is unknown. We surmise that the author's intention has been to put the student in a prob-

lem situation (after the Dewey philosophy) and we believe his method is successful.

STUART M. STOKE,
Ohio University.

V. V. ANDERSON. *Psychiatry in Industry.* Harper and Bros., 1929. 364 pp.

From time to time we have heard about Dr. Anderson's personnel work at Macy's department store, and now have an authoritative description of many of his methods and results. The author lays great stress on the clinical and psychiatric approach. This is a wholesome supplement to much that has already been published on more objective employment methods, such as mental tests. He stresses again and again the desirability of cooperation between medical, psychiatric and the psychological experts. The ideal staff for an employment or personnel office as he sees it involves a psychiatrist, a psychologist and psychiatric social worker.

The chapter on "work failures" outlines the general program of analyzing such failures in terms of social history, job behavior and physical and mental examination. Space does not permit quoting from the numerous illustrative cases, but many such are presented showing how the individual was analyzed and appropriate transfer made with resultant success on the part of the employee. The chapter on "selecting executives" deals with the job analysis of certain minor executive positions, and gives a list of personnel qualifications such as sex, schooling, experience and personality, which come out of such analysis. Under "scientific job placement and guidance" is a discussion of further individual cases, and of the transfers frequently necessary. In one study, of the workers transferred to sales, 90 per cent made good, and of those transferred elsewhere, 100 per cent. The point is made that psychological tests played only a limited part in this. "Job and personnel surveys" form a part of the procedure and often lead to a modification of the job, individual personnel programs, the discovery of problem employees and promotion material. A rather interesting suggestion in connection with the employment program is to give the applicant an illustrated pamphlet describing the job which he or she may peruse while waiting for the employment interview. Cases are cited in which too much reliance on tests and not enough on the interview resulted in erroneous placement. There is a chapter on "industrial health work." Then we have a "psychiatric guide for interviewers," giving an outline of top ics for investigation such as intellectual qualities, motor characteristics, temperament, self-expression, sociability and the like. Specific things for the interviewer to watch for are mentioned, and also some major symptoms of the psychoses. The discussion of "sales clerks" brings out

the fact that there was little correlation of production with any of the tests except those of intelligence and arithmetic, but there was a much better correlation with personality factors as revealed by the interview. Truck drivers were investigated with a view to decreasing accidents. A complicated driving test was part of the procedure. However, something like sixty percent of the accident cases manifested personality defects. The job specifications for this type of work involved an IQ between 80 and 110 and a lot of personality characteristics. The last chapter describes the organization used for test administration. Anderson finds it desirable to use the work limit procedure because the time limit seems to get the applicants excited. A list is given of tests to use for each particular job. The tests are likewise described but there is nothing particularly novel on this point.

The outstanding feature of the book is its emphasis on the psychiatric or clinical aspect, and on the interview as against the more objective test procedure. This is the argument that has been raised in psychological journals before,—for example between Viteles and Freyd. The author sometimes rather belittles tests and at other times welcomes them as a coördinate aspect of the examination. The scientist of course grants that objective quantitative results are ultimately desirable. At present there are some things that we cannot get at in this way and so we have to rely on interviews, case histories, social histories, and the like. Ultimately, many of these can be measured in test form rather than in an interview,—such things as extroversion, for example. Dr. Anderson's work is manifestly successful. The question might be raised whether a systematic test program would not be equally successful. He does mention the importance of the reliability of tests but there is little mention of the statistical reliability of the interview data. It might seem that statistical treatment in general would help somewhat in the evaluation of data such as he collects. We might even consider weighting the different items in the psychiatric record. It would not be particularly amiss to add a statistician to the three members of the staff mentioned above.

This book is replete with cases, and affords excellent illustrative material for one interested in the topic under consideration. The guide for the interviewer's use is excellent. The author does somewhat overemphasize his psychiatric idea as far as the reviewer is concerned, just as those in the other field have sometimes over-emphasized their regression equations. However this shift in emphasis is wholesome and the book is a real contribution.

PAUL PLAUT. *Prinzipien und Methoden der Kunstpsychologie.* Handbuch der biologischen Arbeitsmethoden, Abt. VI, Methoden der experimentellen Psychologie, Teil C[II], Heft 3, S. 745–966.

This monograph is one of a series on Methods of Experimental Psy-

chology in Aberhalden's Handbook. The other most recent one was Giese's Wirtschaftspsychologie. As suggested by the title much of the emphasis is on methodology. It is a rather comprehensive effort and at least opens up many problems. The first main division takes up the psychology of the artist. Biographies and autobiographies afford material for "psychographs." There are elaborate lists of characteristics for evaluation in this way,—for example 90 of them for musicians. A tabulation of musical and control groups on some of these reveals such things as greater emotionality on the part of the former. The emphasis seems to be on the artist's whole personality rather than some specific artistic characteristic.

The process of artistic creation was investigated by a questionnaire to artists covering the way they get the conception or idea for a work, the part played by inspiration and the rôle of consciousness. Typical replies are quoted,—some of them rather verbose and "flowery." The author makes no effort to analyze, interpret or summarize these replies, —perhaps because of their manifest variety. Some artists depend on sense impressions, others get their ideas just before falling asleep, imagery plays a rôle in some cases and there are instances where unconscious factors are involved.

Next we find the psychopathic approach. Some cases of schizophrenic artists are mentioned and a feeble-minded girl with considerable skill in drawing animals. Under the topic of "characterology" we find a presentation of one of the systems of graphology and some of the methods of psycho-analysis. It is suggested that artists are introverts and that their phantasies involve Freudian mechanisms.

The section on "methods of applied psychology" involves more definitely experimental results although the subjects were almost entirely children. Musical preference and musical memory are investigated by conventional methods, the proved ability of children for musical appreciation and rhythm, for example, being a large item. Similar results are presented with reference to judgments of literary form, poems and ornamental designs.

Collections of children's poems make possible analysis of their creative ability. They use iambic meter more often than any other. Heroism and philosophy are frequent topics for their poems but there are sex differences. Children's drawings show changes with age,—the scribble stage, etc. It proves interesting to tabulate the frequency of arms, legs, etc., in their drawings at different ages.

There is a section on musical experience. The records of breathing, pulse, blood pressure, etc., while listening to music shows rather equivocal results. A questionnaire to the musically inclined reveals their attitudes, e.g., whether they synchronize when listening to music or whether they get subsequent imagery and enjoyment. The monograph closes with comments on art from the standpoints of ethnology and sociology.

The work is rather comprehensive and calls attention to a lot of problems and methods,—some of which have little scientific promise. Biographies and questionnaires have their obvious shortcomings. There is little original material included except the unanalyzed results of the questionnaire sent to artists. There is a presentation in considerable detail of numerous studies by others (mostly Germans) in this field. There is little critical evaluation of such studies, little analysis of findings and not much effort to formulate general trends or to come to any conclusions. Summaries are conspicuously absent. Possibly this reflects the paucity of first class scientific contributions to this field. (Some creditable American contributions are overlooked by the way.) One certainly gets the impression that most of the problems of the psychology of art have not been solved. The reviewer feels that the monograph will have little appeal to the general reader interested in the broad field of the psychology of art, but rather to one specializing in some minor aspect who wishes information about what has been done on that aspect and some of the methods and further problems.

HAROLD E. BURTT,
Ohio State University.

GARDNER MURPHY. *Introduction to Modern Psychology.* Harcourt Brace and Company, New York, 1929.

This book articulates well the profound changes which psychology underwent as it was unwinding itself from the discipline of philosophy during the nineteenth century. Further, the changes which are still being wrought in this nineteenth century are brought to light in an intelligible and readable manner.

Beginning with the intellectual background of the seventeenth century the author shows how modern psychologies had their beginning and how schools sprang up and how each one adhered to its own leader and the theory or theories which he enunciated. A quotation from page one will set forth the viewpoint of this book. "From color-theories to defense mechanisms, from the functions of a white rat's visceral to the mystic's sense of unutterable revelation, from imaginary playmates to partial correlations,—wherein lies that unity of subject matter which leads us to speak compactly enough of 'contemporary psychology'?" Further, "From behaviorism to Gestalt psychology to psychoanalysis or the objective measurement of character, the eye wanders over an interminable range of experiments, measurements, hypothesis, dogmas, disconnected facts, and systematic theories. In a sense it is true to say that thru all the vast melange the very birth-cry of the infant science is still resounding." The author has set forth these theories, interwoven in all their intricateness with schools of thought in every

discipline which touches, or has touched mankind, with the cool calm perspicacity of a "born historian."

The book is divided into three parts. Part I, beginning with Descartes and his interactionism, followed by Spinoza's "Monism," and Leibnitz' "parallelism," deals with these three fundamental psychological theories which dominated eighteenth and nineteenth century thought and in many forms is still with us. Berkeley, Hobbes, Locke, Hume and others find ample treatment in an historical way in this section. The influence of evolutionism and of quantitative measurements on psychology during the early and the middle part of the eighteenth century pave the way for an experimental science, which finds expression in the period of time between Weber's experiments and the "Wundtian age."

In Part II one finds the names of men like Fechner and Müller in Germany; Hamilton, James Mill, Bain and Spencer leading the British and Scottish schools of thought. While there is much overlapping in 'thought' and 'trends' during this period the author skillfully directs the reader to the most pertinent influences of the times on psychology. After Darwin and Spencer comes Galton, followed by statistical and genetic methods. From 1879 psychological investigations take on respectable clothes and are not dependent upon physiological techniques alone.

Part III, beginning with Ebbinghaus, sees the advent of theories based on experimental evidence,—whole and part learning, saving method as contrasted with the psychological methods, such as "average error", etc. Neurology gives to psychology theories of the synapse, the neurone, etc. In the last part of the book one finds the names of James, Titchener, Münsterberg, Hall, Freud, and Brewer, McDougall, Watson and others of contemporary standing.

A supplement of contemporary German psychology, both as a "natural science" and as a "cultural science," is written by Heinrich Klüver. The book impresses the reviewer as being scholarly, thorough, and readable—a contribution to the history of psychology.

JAMES R. PATRICK,
Ohio University.

NEW BOOKS AND PAMPHLETS RECEIVED*

Books and pamphlets for review should be sent to James P. Porter, Department of Psychology, Ohio University, Athens, Ohio.

Developing Appreciation Through Teaching Literature. ANGELA MARIE BROENING. Studies in Education, No. 13. Johns Hopkins Press, Baltimore, Md. $2.00. 118 pp.

The Educational Clinic of the Department of Education. MARY LORETTE DOUGHERTY. Johns Hopkins Press, Baltimore, Md. $1.25. 78 pp.

The History of Psychology. W. B. PILLSBURY. W. W. Norton & Co. New York City. 326 pp.

Individual Differences in the Reading Ability of College Students. ERNEST MITCHELL ANDERSON. Bulletin Vol. 29, No. 39. University of Missouri, Columbia, Mo. 77 pp.

Proceedings of First Colloquium on Personality Investigation. American Psychiatric Association, New York City. 102 pp.

Science and the Way to Health. J. MACE ANDRESS AND MAUD A. BROWN. Ginn & Company, New York City. 365 pp.

Statistical Study of the Individual Tests in Ages VIII and IX in the Stanford-Binet Scale. J. E. W. WALLIN. Mental Measurement Monographs, June 1929. Williams & Wilkins Company, Baltimore, Md. 58 pp.

Systematic Psychology. EDWARD B. TITCHENER. Macmillan Company, New York City. $2.50. 278 pp.

Teaching in College and University. CARTER V. GOOD. Warwick & York, Baltimore, Md. $3.00. 557 pp.

A Theoretical Basis of Human Behavior. Revised Edition. ALBERT PAUL WEISS. R. G. Adams & Company, Columbus, Ohio. $3.00.

---

* Mention here does not preclude further comment.

Directory of American Psychological Periodicals (*Continued*)

Journal of Personnel Research—Baltimore: Williams & Wilkins Co. Subscription $5.00. 500 pages approximately. Edited by Walter V. Bingham, and Clarence S. Yoakem. Bi-Monthly.

Genetic Psychology Monographs—Worcester, Mass.: Clark University Press. Subscription $7.00 per volume. Two volumes per year, 600 pages each. Edited by Carl Murchison and an international co-operating board. Monthly. Each number one complete research. Child behavior, differential and genetic psychology. Founded 1925.

Psychological Abstracts—Princeton, N. J. Subscription $6.00. 600 pages ann. Edited by W. S. Hunter. Monthly. Abstracts of psychological literature. Founded 1927.

Mental Measurement Monographs—Baltimore: The Williams & Wilkins Company. Subscription $5. 400 pages annually. Founded 1925. Edited by Knight Dunlap and Buford Johnson. Published without fixed dates, each number a single research.

Studies in Psychology and Psychiatry—Baltimore: The Williams & Wilkins Company. Subscription $5. 400 pages annually. Founded 1926. Edited by Edward A. Pace. Published without fixed dates, each number a single research.

Journal of General Psychology—Worcester, Mass.: Clark University Press. Subscription $7. 600–700 pages annually. Edited by Carl Murchison and an international co-operating board. Quarterly. Experimental, theoretical, clinical, and historical psychology. Founded 1927.

Directory of American Psychological Periodicals

American Journal of Psychology—Ithaca, N. Y.; Morrill Hall.
Subscription $6.50. 600 pages annually. Edited by M. F. Washburn, K. M. Dallenbach, M. Bentley, E. G. Boring. Quarterly. General and experimental psychology. Founded 1887.

The Pedagogical Seminary and Journal of Genetic Psychology—Worcester, Mass.: Clark University Press. Subscription $7. 700 pages annually. Edited by Carl Murchison and an international co-operating board. Quarterly. Child behavior, differential and genetic psychology. Founded 1891.

Psychological Review—Princeton, N. J.: Psychological Review Company. Subscription $5.50. 480 pages annually. Bi-monthly. General. Founded 1894. Edited by Howard C. Warren.

Psychological Bulletin—Princeton, N. J.: Psychological Review Company. Subscription $6.00. 720 pages annually. Psychological literature. Monthly. Founded 1904. Edited by Samuel W. Fernberger.

Psychological Monographs—Princeton, N. J.: Psychological Review Company. Subscription $6.00 per vol. 500 pp. Founded 1895. Ed. by Raymond Dodge. Published without fixed dates, each issue one or more researches.

Psychological Index—Princeton, N. J.: Psychological Review Company. Subscription $4.00. 300–400 pp. Founded 1895. Edited by W. S. Hunter. An annual bibliography of psychological literature.

Journal of Philosophy—New York; 515 W. 116th St.
Subscription $4. 728 pages per volume. Founded 1904. Bi-weekly. Edited by F. J. E. Woodbridge and Wendell T. Bush.

Archives of Psychology—Sub-Station 84, N. Y.: Archives of Psychology. Subscription $6. 500 pp. ann. Founded 1906. Ed. by R. S. Woodworth. Published without fixed dates, each number a single experimental study.

Journal of Abnormal Psychology and Social Psychology—Albany, N. Y.
Subscription $5. Boyd Printing and Publishing Co. Edited by Morton Prince in co-operation with Floyd H. Allport.
Quarterly. 432 pages annually. Founded 1906. Abnormal and Social.

Psychological Clinic—Philadelphia: Psychological Clinic Press.
Subscription $2.50. 288 pages. Ed. by Lightner Witmer. Founded 1907. Without fixed dates (9 numbers). Orthogenics, psychology, hygiene.

Training School Bulletin—Vineland, N. J.: The Training School
Subscription $1. 160 pp. ann. Ed. by E. R. Johnstone. Founded 1904. Monthly (10 numbers). Psychology and training of defectives.

Comparative Psychology Monographs—Baltimore: Williams & Wilkins Co.
Subscription $5. 500 pages per volume. Edited by W. S. Hunter. Published without fixed dates, each number a single research.

Psychoanalytic Review—Washington, D. C.: 3617 10th St., N. W.
Subscription $6. 500 pages annually. Psychoanalysis. Quarterly. Founded 1913. Ed. by W. A. White and S. E. Jelliffe.

Journal of Experimental Psychology—Princeton, N. J. Psychological Review Company. 500 pages annually. Experimental.
Subscription $6.00. Founded 1916. Bi-monthly. Ed. by Madison Bentley.

Journal of Applied Psychology—Baltimore: The Williams & Wilkins Co.
Subscription $5.00. 400 pages annually. Founded 1917. Bi-monthly. Edited by James P. Porter, Ohio University, Athens, Ohio.

Journal of Comparative Psychology—Baltimore: Williams & Wilkins Co.
Subscription $5. 500 pages annually. Founded 1921. Bi-monthly. Edited by Knight Dunlap and Robert M. Yerkes.

(Continued on Third Cover)